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ABP

Protecting the Investment

By Wendy Lea McKibbin
Senior Editor

Microcomputers may be the fastest growing segment of the computer market, but minis and mainframes still command the largest market share and support a multimillion dollar industry for computer environmental control equipment.

Not every mainframe needs cloistering in a computer room where heat, humidity, power, dust and air contaminants are tightly controlled. Some mainframes can chug away in a dirty factory environment. A good number of minicomputers can and do operate at normal room temperature, and most business microcomputers perch on desktops scattered throughout the office.

But a mainframe designed for use in a special computer room is like a snail out of its shell if the air conditioning is snafued.

Management Information Systems (MIS) manager Joe Riera recalls an experience that illustrates the environmental care demanded by "prima donna" mainframes. Now the Director of Information Systems for Plantronics Corp., Riera once worked for a company in San Diego during a particularly hot summer. One week the air conditioning for the entire building went out, bringing activities in the computer room to an abrupt halt. Unfortunately, the necessary part needed to reinstate the system could only be obtained in Virginia. Thus it was not expected that the cooling system would be operational for several days.

Riera solved the problem in an unusual fashion. He went to United Airlines and borrowed a portable air conditioning unit used for cooling the DC8 jets. The system sits on a flatbed truck and has an enormous tube hooked to its side. Riera rolled the unit to the back door of the computer room and fed cool air during the evening hours—the only time he felt it was safe to run the mainframes.

Big systems like the ones Riera tended are not the only pampered machines in today's corporation. Several major precision air conditioning companies report that at least half of their environmental control systems are sold to minicomputer users. Marketing manager Tom Brown of Liebert Corp. in Columbus, OH, explains that the principles of heat and humidity control apply to any sized computer, although obviously a smaller, more sparsely packed system wreaks less havoc on its surroundings than a large one.

"It's like putting one coffee pot in the kitchen, versus 1,000 pots. In both cases you have the same electrical equipment, but with quite different effects on the environment," says Brown.

Generally speaking, minicomputers are better able to survive in an office environment because they are designed with fewer components, hence generate

At left: The DPU 360, from Innovations In Control Inc., is a self-contained alarm/control system whose sensors monitor all aspects of operating conditions in a computer room. The unit alerts personnel, and if necessary powers down the computer. Temperature, humidity, line voltage, line frequency, smoke, water, blackout and brownout are monitored. The front panel displays temperature and humidity and pinpoints the reason for an alarm via latching indicators. This eliminates the confusion of multiple alarms and provides information at a glance. In case of an alarm an optional dialer dials a preprogrammed phone number and transmits a recorded message.

Above: These "stack pack" modules from Data Systems Design minimize the effects of heat and humidity on microcomputers by breaking up the system into several units. The bottom module houses the central processing unit; other modules contain the Winchester disk drive, the tape drive and floppy disks. Data Systems Design claims that by separating the components of the system into small boxes, there is less heat and less noise than one would find with single boxes. The company also claims that the air temperature inside each box only rises three degrees by the time it leaves the module.

less heat. But Brown is not certain that minis and humans can always happily coexist without special environmental intervention. A mid-sized system emits 650 British thermal units (Btu) per hour, just as does the human body, which means that a computer plus a human equals two people in terms of the air conditioning load. There is also the problem of noise.

"In order to be competitive, NCR, Burroughs, Digital and other companies have said that a minicomputer can go into the office environment. But add disk drives, printers, more memory, and suddenly, you have a heat load and noise problem," says Brown. "At that point someone is likely to put the system in a back room, where it will not be heard." He concludes that then the small enclosure will heat up, thus requiring environmental control.

It is Brown's conviction that if the average field engineer were questioned long enough, he would admit that systems with heat, humidity and power supply control see a longer period of time between service calls. Jim Good, vice president of marketing for AC Manufacturing Co. (makers of the "EdPack" environmental control system) agrees with Brown.

"Thermal shock stresses any computer equipment," says Good, in explaining the need for a constant temperature. "It's like bending a coat hanger again and again in the same place, which makes it susceptible to breaking."

Does that mean every mini needs more precise control than the normal office environment in order to function at its optimum level? Not quite, says a spokesman for Digital Equipment Corp.'s (DEC) corporate environment field support group.

Liebert Corp.'s top-of-the-line microprocessor control system, Deluxe System/3, monitors both locally and remotely, and is programmable. This System/3 microprocessor monitor panel indicates operating mode, room conditions and alarms, and programming of the system. Liebert claims to be the only company offering both environmental control and power protection systems that interface with a single remote, standalone monitoring system.

"It really depends on the customer's applications as to whether or not heat and humidity have to be tightly controlled," says the DEC spokesman. "If the customer can live with a 95 percent availability of his system, he can probably stand housing his minicomputer in a nominal environment. If he needs 100 percent availability of the system, then tight control is advisable."

Murray T. Smith, treasurer of Antioch Publishing Co. in Yellow Springs, OH, is a former DEC customer who decided that a minicomputer needs "the second mile" of protection. He recalls that two years ago, after a rather dismal experience with a PDP-11/34 that "could barely stay up for 12 hours at a stretch," he decided to take drastic measures. He not only switched to an equivalent Hewlett-Packard system, but he purchased an environmental control unit from Liebert that incorporates heat, humidity and power management into a single system.

"I have a very expensive mini that represents a $400,000 investment," says Smith. "I felt that it was more than worth it to invest $1,000 in environmental control."

Even more than the regulation of heat and humidity, Smith found that the power supply control provided by the Liebert unit was invaluable to the proper functioning of his system, given the erratic power supply in his area. He explains that Yellow Springs is a village of 5,000 that buys its electricity from

Dayton, with sometimes unpredictable results.

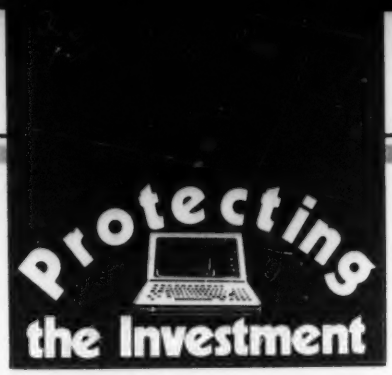
"Our irregular power supply may have had as much to do with the poor performance of the DEC system as anything," Smith speculates. "All I know is that now my minicomputer works fine, and I would recommend anyone taking similar steps to protect his investment."

Apparently, Smith's experience is not that unusual, according to Jim Garrett, product marketing manager for Air Flow, one of the larger precision air conditioning companies that cater to the computer industry.

"Several years ago a number of computer equipment manufacturers came out with medium- to large-sized systems that supposedly did not require environmental control," says Garrett. "But after experiencing a great deal of downtime and maintenance costs, users went back to using dedicated computer rooms with air, humidity and power regulation."

Garrett thinks that the industry will be using systems such as the ones made by his company for some time to come, given the current state of technology. "If the central processing unit (CPU) of a system could be hermetically sealed, and the core cooled with helium, nitrogen or water, then possibly we would see an end to environmental control," he says. "But the humidity issue would still exist for printers and certain peripherals."

It would appear that heat and humidity are always a problem in a data



High temperatures aggravate a situation and tend to flush out the weak spots in a component.

center, where optimum conditions for operation are 50 percent relative humidity and 70 degrees Fahrenheit. If the humidity increases above 60 percent, the likelihood of a layer of water molecules developing on the equipment increases, thus posing long-term problems of corrosion. If the humidity decreases below 40 percent, then static electricity builds up.

Static is a problem for computers and peripherals alike. It particularly bothers computer media such as paper, cassette tapes and other magnetic storage devices. Too much static electricity can cause paper to stick in a printer and can even cause disk drives to misread. (Thus in DEC's plant in Greenland, where the humidity is five percent, the magnetic storage devices are stored in a secluded location to minimize discharges from human contact.)

If static electricity touches the integrated circuit board itself, it can damage the molecular structure of the circuitry and weaken the components. While this is not as much of a probability after the computer has been assembled, the danger posed by static electricity has caused component manufacturers to take more protective measures in recent years.

According to a Hewlett-Packard spokesman, integrated circuit manufacturers have been so diligent in providing anti-static protective measures in the factory and in the field, that components have seen a dramatic quality increase since 1975. The failure rate for components tested today at the Hewlett-Packard facility is one-half the number it was eight years ago, the spokesman explained, which indicates a fundamental change in manufacturing procedures.

While more often than not it is static electricity stemming from low humidity that troubles the data center—because computers put out a dry, hot heat that dehydrates the ambient air—high humidity can also occur, and with it comes problems. For example, damp air can lead to corrosion, can cause paper to

They Survived the Tent at NCC

The "tent" at the 1983 National Computer Conference (NCC) in Anaheim, CA, last May was the scene of a *brouhaha*, when the air conditioning failed to function properly and temperatures and tempers soared. Angry exhibitors housed in the pavilion rather than in the main building sweltered in the 114°F heat as they struggled to keep systems from crashing. But a surprising number of microcomputers passed the "NCC Heat Test" with flying colors, thus illustrating the hardiness of low-end systems, and the relative freedom they enjoy from environmentally controlled conditions.

"The boom in the personal computer market will not affect the overall growth of controlled environment equipment," says Jim Good, vice president of marketing for AC Manufacturing Co., a firm which makes precision air-conditioning equipment. "I wish it were otherwise, but I don't think microcomputers would sell unless they could be used just about anywhere."

It seems safe to say that the NCC tent where the temperature was 114°F is an extreme case of "just about anywhere."

"I was frankly amazed that our system worked as well as it did," says Al Davis of Molecular Computers, who ran his "SuperMicro 32" computer with 12 terminals during the entire show. The only problem Davis encountered was that two to three times a day, the system would "hang" or suspend operations. This required the power to be turned off, before the system could be brought up again. Later, everyone who worked at the Molecular booth received a T-shirt with the slogan, "I survived the tent at NCC."

Another happy survivor was Dave Callan, chairman of Callan Data Systems, whose company had six systems set up in the tent. "We burn in our systems at 104°F," says the incredulous Callan, "which means that our systems prevailed in the tent under higher temperatures than we use for testing purposes!"

Callan reports that his systems never did go down, although on the hottest day he noticed that one was exhibiting "erratic behavior." The peripherals and floppy disks suffered far more than the systems did, he recalls.

"Actually, microcomputers are pretty tough where heat is involved," says Callan, who remembers a bizarre incident that happened several years ago in his plant. One day an electrical storm caused the power in the company's building to switch off and on, thus making an oven malfunction in one of the testing chambers. There was a microcomputer accidentally left in the oven that endured a temperature of 200°F—just short of boiling.

"All of the plastic melted," recalls Callan. "The system keyboards sagged, the front cover of the unit was distorted, the floppy disks literally dissolved." But the system was made of hardier stuff. When an engineer discovered the unit and turned it on, it worked.

absorb moisture, and can damage the integrity of the integrated circuit packet interconnections. Humidity can also activate contaminants in the air such as chlorides. These contaminants, to which computers are more sensitive than humans, can cause corrosion, migration of copper and other metals, and can cause interference with the circuits.

But the standard imp of the computer room is heat. High temperatures aggravate a situation, and tend to flush out the weak spots in a component, says Jim Gillette, quality and reliability manager for the Data Systems Div. of Hewlett-Packard. The higher the heat, the more accelerated the failure rate for a given device. If, in the original design of a component, the designer has allowed a margin for heat, the part can withstand natural thermodynamic changes without experiencing damage, he explains. But if there is some imperfection in the part, excessive heat can cause a hard failure of the circuitry, leading to electromigration, even irreversible damage.

An example of an imperfection, says Gillette, might be an integrated circuit that has a faulty seal around the pins. When the power is turned on, the moisture is driven out. But when the piece cools down, the moisture is drawn back in where it can react with corrosive elements.

This one example of what heat can do to a solid state device readily explains the continuing presence of dedicated computer rooms, despite the fact that some of the newer systems have cooling capabilities built into the equipment.

Actually, a system can be designed to function under almost any condition, as witnessed by the fact that integrated circuits can operate under the hood of a car, says a Burroughs spokesman. But there are trade-offs in speed and function. The intended environment specifies the permissible density of circuit board packaging, the power requirement and the manner in which heat will be removed. Any way you cut it, says the Burroughs spokesman, a system designed for a controlled environment will offer more performance per cubic foot than a system that can function at random locations in the factory or office. Which is one reason why there may be dedicated computer rooms long into the foreseeable future.

Distributed data processing in general and the influx of microcomputers in particular *are* making changes in the controlled environment picture. But some think they may never totally eliminate the need for dedicated computer rooms.

According to sources at both Burroughs and DEC, there will always be a need for mainframes. And as long as there are mainframes, there will always be a need for a central computer room characterized by environmental control and maximum security. They say there are two reasons for this. First, a mainframe offers more performance per dollar investment when heat, humidity and power can be tightly managed. And secondly, mainframes often handle data of a confidential nature. Thus the need for performance and security virtually ensures the status quo of the computer room.

As a matter of fact, business is up for several of the major precision air conditioning companies who supply equipment for these rooms, such as Air Flow, who claims to have seen a 500 percent increase in its domestic sales last year. HiRoss reports a 200 percent increase, and Liebert says that sales are "strong." Furthermore, according to a recent Frost & Sullivan report, the annual growth rate of the market for computer environmental support equipment is nearly 18 percent, which, the report says, "is somewhat better than that of the computer equipment itself."

One reason for the strong sales, says HiRoss, is that many people are upgrading their equipment. More power means more heat, which means the need for better heat and humidity control. Another reason for the increased business, says Liebert, is that people are beginning to recognize the value of protecting their investments. Still another reason, says Frost and Sullivan, is simply that high-end computers are continuing to penetrate new markets, although at a slower rate than micros. And the big systems require special environmental attention.

But at least one MIS manager does not view this news as progress. "I think we will never realize the full potential of distributed data processing and the information explosion unless we can shake free of the old-styled, air-conditioned computer room," says Bob Graham, MIS manager for the DEC plants in Europe, "and put systems out on the floor, as needed."

If Graham is right, then full fruition of the distributed data processing movement may be a long time in coming. For environmental control systems seem to be here to stay. (IN)

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Protecting the Investment

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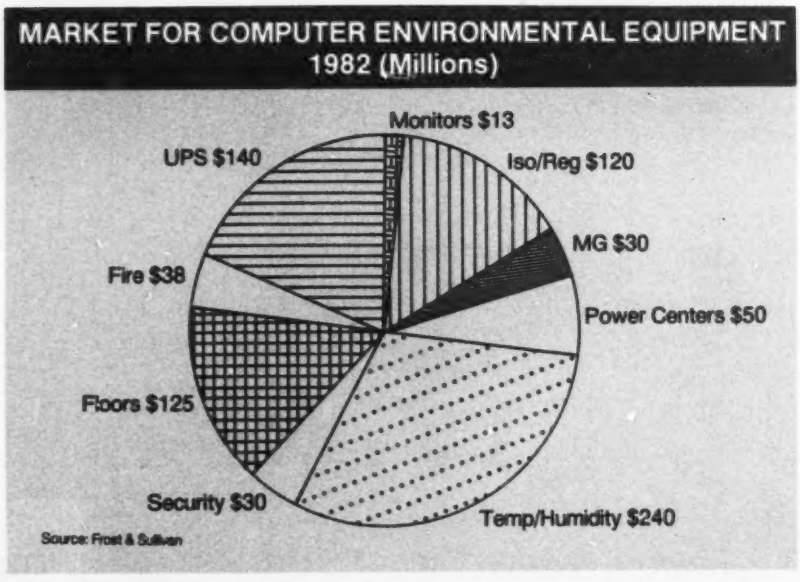

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Semi-Annual Software Review

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Office Automation

Many managers see OA simply a means to speed up clerical tasks

Can office automation live up to its highly touted role as savior of white collar productivity? One expert says yes, if managers overcome misconceptions about what the technology can do for them and their staffs.

Commenting on an office automation survey sponsored by Honeywell, author and Yale professor Dr. Rosabeth Moss Kanter said that many managers perceive office automation as simply a means to speed up clerical tasks like typing, overlooking its potential to help analyze information and solve problems. In addition, managers do not appear willing to delegate more responsibilities to clerical staff whose time has been freed up by office automation tools.

"Computers are being used (in offices) mainly as 'hand tools' to relieve drudgery instead of as 'head tools,' " stated Kanter. "Managers want to maintain current roles and, in some cases, even use automation to eliminate rather than increase communication with workers."

The Honeywell survey, conducted by Response Analysis, Princeton, NJ, indicates that office automation is still the exception rather than the rule in most companies. Less than half of 443 companies surveyed has word processors, while three out of four secretaries and nine out of ten managers do not use personal computers.

Smaller companies and those located in the South were found to be particularly lagging in implementing office automation. The study also shows the great majority of managers and office workers believes that office automation is positive. But senior managers and secretaries were more likely than others to have doubts about its benefits in their own jobs — as were managers that don't type. This suggests people associate office automation with clerical tasks.

Kanter said that office automation can boost productivity only if managers, office workers and vendors work together to implement systems to do more than typing. "We need to create conditions, especially inside large organizations, that make it possible for individuals to get the power to think, to experiment, to create, to develop, to test, to innovate," she said. "Whereas short-term productivity can be affected by purely mechanical systems, innovation requires intellectual effort."

When planning for office automation, companies should form a steering committee that emphasizes obtaining feedback from all levels of the organization, Kanter advised. This feedback should continue through implementation of the system, training, and then monthly on a permanent basis after the system is in use. —DHF

Personnel

Computer professionals pleased with jobs

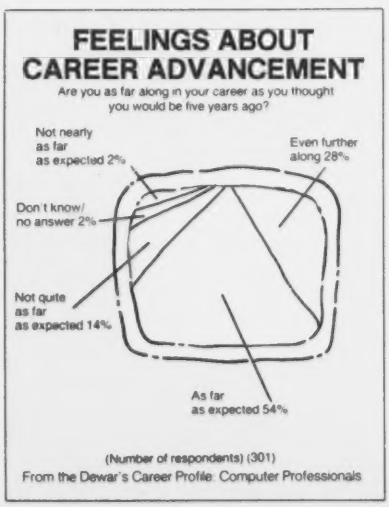
A national career survey on the computer industry reports high levels of satisfaction among computer professionals and cites creativity as the single most important aspect of the job.

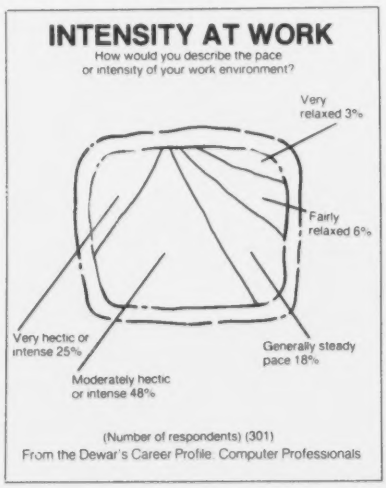
These are some of the major findings in the newly released *Career Profiles of Computer Professionals* based on interviews with over 300 men and women currently employed in the computer field.

The high degree of job satisfaction is demonstrated by the fact that 94 percent of the computer professionals polled said they would not consider leaving the data processing (DP) field. Eighty-one percent indicated they would not move into another area of DP.

Part of this satisfaction can be attributed to career advancement. More than half of the respondents said they are as far along in their careers today as they thought they would be five years ago. Another 28 percent indicated they are further along than they thought they would be.

The survey, conducted by Research & Forecasts, Inc., New York, and sponsored by Dewar's "White Label," identifies three types of computer professionals: computerholics, overtimers and nine-to-fivers.


FEELINGS ABOUT CAREER ADVANCEMENT
Are you as far along in your career as you thought you would be five years ago?
Not nearly as far as expected 2%
Even further along 28%
Don't know/ no answer 2%
Not quite as far as expected 14%
As far as expected 54%
(Number of respondents) (301)
From the Dewar's Career Profile: Computer Professionals


INTENSITY AT WORK
How would you describe the pace or intensity of your work environment?
Very relaxed 3%
Fairly relaxed 6%
Generally steady pace 18%
Moderately hectic or intense 48%
Very hectic or intense 25%
(Number of respondents) (301)
From the Dewar's Career Profile: Computer Professionals

Computerholics, who devote at least 50 hours a week to their jobs, comprise 22 percent of all computer professionals and function in an environment they describe as "extremely hectic." Overtimers, who spend between 41 and 50 hours a week at their jobs, constitute 57 percent and describe their work as "moderately hectic." Nine-to-fivers, who devote 40 hours or less a week to their jobs, describe their work as "generally steady or relaxed."

Despite the theory that the computer revolution would usher in a paperless society, computer professionals overall cited paper work as the chief complaint.

Survey findings also show that computer professionals acknowledge the technical requirements of the field but feel that "being creative" and traditional English skills are very important to the successful pursuit of their careers. —WJC

operations management; MAI Sorbus Service Div., accountable for maintenance; Software Centre International, supplier of software; Moore Business Center, supplier of computer-related products; and PC Telemart, an on-line and hardcopy library service and supplier of products.

"We've set it up so the federal employee has genuine 'one-stop shopping,'" explains Bill Frazer, special assistant to the administrator. "We offer lower-than-retail prices and a wide array of support functions, which include training, configuration and pre-purchasing assistance, maintenance and hand holding after the purchase."

Because of the emphasis on pre- and post-sale support, sales are limited to a 50-mile radius of the store. Frazer stresses that it would be too difficult to properly service users outside of the immediate area, but that eventually other government employees might enjoy similar provisions.

"This is a pilot project. If it is successful we have plans to expand to the rest of the country with other stores," says Frazer, who identifies some possible sites as San Francisco, Denver, Chicago, Kansas City, Atlanta and New York City.

So far, the GSA store has exceeded the administration's highest expectations. It was estimated that the operation would be a $2 to $3 million business in its first year. Since its debut in August, it has already grossed $4 million. The staff of sales and support professionals has increased from 10 to 24 people.

The single largest user

The potential volume for stores such as this prototype is colossal. Long recognized as the single largest user of computer services, the federal government is expected to have as many as one million microcomputer users in its employ within the next six years. The magnitude of computing power needed by the administration can best be understood when one recalls that the government is nothing but an information business, Frazer points out.

To meet the growing needs of federal users for personal computing power, the GSA store is well-stocked with an extensive menu of hardware. The choices for a qualified employee include the IBM PC or XT; the Apple IIe, III or Lisa; the DEC Rainbow or Professional system; the Osborne OCC-1 and Executive I; or systems made by Compaq, Fortune, Zilog, Molecular, Altos, Onyx or Televideo.

Frazer quickly declares that no federal hireling is expected to brave this hardware extravaganza alone. The primary purpose of the store is to shepherd the individual through the PC wilderness until he or she finds the perfect system for the problem at hand.

Setting up the federal computer store was more complicated for the GSA than it would be for a member of the private sector, says Frazer, due to the many rules and regulations which have to be observed. "But if I were an MIS director

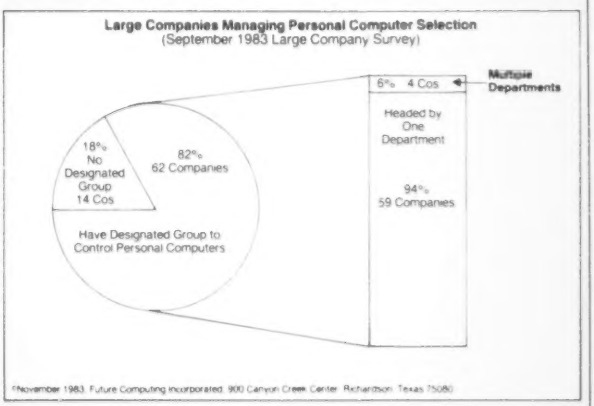
PCs Now Firmly Under the Wing of MIS?

Much evidence suggests that the majority of Management Information Systems (MIS) managers now realize the acquisition and support of personal computers is an extension of their regular roles. At least that's what a recent survey conducted by the Texas-based research firm Future Computing seems to indicate.

The company did a random sampling of the 2,000 largest US corporations to determine how widely personal computers were being used and how much support the microcomputers were receiving within the organization. They found, among other things, that 77 percent of the MIS directors interviewed had a lead or key role in establishing PC policies.

The in-house support figures broke out as follows:

- 76 percent of the companies had some central facility for PC support;
- 58 percent offered training and user support only;
- 6 percent had an in-house computer store in place (similar to a commercial retail outlet) staffed by the MIS/data processing (DP) organization. The typical in-house store provided product demonstrations, group and individual training sessions, coordination and purchases and service needs.


Large Companies Managing Personal Computer Selection
(September 1983 Large Company Survey)
6% 4 Cos
Multiple Departments
Headed by One Department
94% 59 Companies
18% No Designated Group 14 Cos
82% 62 Companies
Have Designated Group to Control Personal Computers
*November 1983, Future Computing Incorporated, 900 Canyon Creek Center, Richardson, Texas 75080

Management of Personal Computers in Large Companies

	# of Companies	% of Companies
Have Not Designated a Group or Department for PC Management	14	18
Have Designated a Group or Department	62	82
PC Management Led by	# of Companies	% of Companies
One Department	58	94
• Which is:		
DP	25	43
MIS	19	33
Corporate	10	18
Communication	2	3
Other	2	3
Multiple Departments	4	6
• Which		
Include MIS or DP	4	100
Do Not Include MIS or DP	0	0

*November 1983, Future Computing Incorporated, 900 Canyon Creek Center, Richardson, Texas 75080

According to Dr. Harold Kinne, senior vice president of Future Computing, widespread recognition exists among companies surveyed that MIS was an ideal center for coordinating PC activities and support. Eighty-two percent of those questioned by Dr. Kinne had designated a particular group in the organization to manage personal computers. Of that number, 94 percent had a single department responsible for coordinating PC activities. And 76 percent of the time, that single department was data processing or MIS.

Almost all of the companies in the survey intend to increase user support for personal computers within the next few years, although not necessarily in the form of an in-house computer store. This is advisable, says Kinne, in view of Future Computing's estimates that there may be as many as 1,975,000 personal computers shipped to US businesses by 1988. (IN)

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MARCH 1984

INFOSYSTEMS

THE MAGAZINE FOR INFO MANAGEMENT

Exclusive Survey:

The 'Mythical' Datacomm Manager

3rd Semiannual Microcomputer Software Review

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The 'Mythical' Datacomm Manager

By Wayne L. Rhodes, Jr., Editor
and Perry S. True, Director,
Hitchcock Research Services

An unprecedented survey of Management Information Systems/Data Processing (MIS/DP) managers reveals that the emergence of data communications is expanding not diminishing their own role. Three quarters of the nearly 1,600 survey respondents said datacomm responsibility rests with MIS/DP. Fewer than 12 percent of the respondents said the person responsible for datacomm is the Data Communications Manager. Of those few who replied that they even have a datacomm manager, 67.5 percent said that person reports to MIS/DP.

The survey, conducted by Hitchcock Research Services of Wheaton, IL, indicates the extent of present datacomm usage and expansion plans for various systems and products. The respondents also offered candid views on major problems they're encountering and on the factors they consider most important when purchasing datacomm systems and equipment.

The survey was conducted in January 1984, with questionnaires mailed to 4,000 persons drawn from a nationwide sampling across all industries. Among the respondents, 81.7 percent have MIS/DP job titles (77.8 percent man-

Many suppliers are looking for a datacomm manager to buy their wares, but a recent survey indicates that person is little more than an extension of the MIS/DP manager's role and doesn't actually exist.

Role in the Specification or Purchase of Data Communications Equipment and Services

Advice and consult	73.6%
Determine the need	73.5%
Recommend type of equipment or supplier	63.8%
Specify type of equipment or supplier	51.4%
Approve the purchase	38.4%
Not involved	3.8%
Base	1,538 100%

Expansion Plans by Present Users (Next 12 Months)

	Local Systems	Metropolitan Area Systems	Long Distance Systems
Base: Presently Have System	1,176 100%	496 100%	859 100%
Will expand moderately	47.4%	40.3%	40.5%
Will expand substantially	10.3%	9.5%	12.5%
Will change or replace present systems	12.2%	9.7%	11.8%
No changes planned	30.1%	40.5%	35.2%

agement; 3.9 percent staff) and 18.3 percent are from corporate management. Responses came from 1,575 persons providing a return of nearly 40 percent to the four-page questionnaire.

Those using or planning to use datacomm were asked to say how they are personally involved in the specification or purchase of equipment and services. Seventy-four percent said they determine the need; 63.8 percent recommend the type of equipment and supplier. Fifty-one percent specify the equipment or supplier. Nearly 40 percent approve the purchase.

Management not attuned

Except for the MIS/DP role, the status of data communications within organizations appears to be not particularly well defined. Nearly 18 percent of the respondents said datacomm falls under some other function within their organizations. Those functions encompass a wide gamut that probably indicates the state of datacomm implementation itself. For example, datacomm responsibility resides as high as the Chief Executive Office or with a "committee headed by the President." Or it also sits with such disparate entities as the Administrative Services Director, the Business Manager, the Chief Engineer or the Controller/Comptroller.

Still others don't report the datacomm responsibility sitting nearly so impressively. Some named the Technical Support Analyst and Systems Programmer as having responsibility. Some indicated it has little or no status: The "General Manager will have the responsibility at the outset" in one organization; the manager of long-range planning has it in another. One respondent said, "No one is really in charge. Upper management is not attuned." Another lamented that nobody has really taken on the responsibility.

The level of implementation seems to be as varied as the designation of responsibility. Survey respondents were asked to indicate which of three datacomm system types their company presently has or plans to add in the next 12 months. The three systems are local, metropolitan and long distance. Nearly 75 percent responded that they have a local system; 31.5 percent have a metropolitan; and 54.5 percent have a long distance one.

Anticipate change

By company size, usage of datacomm was slightly higher as the number of employees in the company increased. By industry, the financial, transportation and DP service organizations reported the highest usage of one or more of the three systems studied. Those in construction/mining/agriculture reported the lowest level of usage.

Those using datacomm were asked to indicate what their plans are for the next 12 months. Of the 1,440 who indicated that they presently use datacomm, all answered one or more parts of the question. Of those who said they have local systems, 47.4 percent said they will expand moderately; 10.3 percent plan substantial expansion; and 12.2 percent will change or replace their present system. Thirty percent plan no changes.

Deregulation of AT&T may be causing concern among users, especially those who responded that they anticipate changes in their current systems. Of those with long distance systems, 40.5 percent plan to expand moderately; 12.5 percent substantially; and 11.8 percent expect to change or replace their current system. Thirty-five percent plan no changes.

What's important

Activity in the metropolitan area systems is similarly vigorous, although those standing pat is higher than with the other two systems. Respondents planning to expand moderately came in at 40.3 percent, but 40.5 percent said no changes are planned. Those expanding substantially and changing or replacing the present system were similar figures, 9.5 and 9.7 percent, respectively.

Those using datacomm were asked to indicate which of 12 products and services their company presently uses and which they plan to add within the next 12 months. Of the 1,440 current users, 98.7 percent answered as to types of products/services they presently use. Of

The 'Mythical' Datacomm Manager

Products and Services

	Presently Use	Plan to Add In Next 12 Months
Terminals	94.8%	53.6%
Modems	90.2%	49.9%
Printers	89.4%	45.7%
Communications software	62.1%	31.5%
Private line	57.2%	21.9%
Communications processors	47.4%	19.8%
Multiplexers	42.2%	28.8%
PABXs	41.7%	12.4%
Converters, (protocol, interface, etc.)	30.3%	28.7%
Diagnostic and test equipment	28 4%	14.9%
Carriers (common, value-added, packet-switching)	27.0%	17.6%
Local area networks	24.1%	28.1%
Base	1,421	864
	100%	100%

Number of Respondents by Job Title

	No. of Respondents	Percent
DP/MIS Operations		
DP/MIS Management	1,094	69.4%
DP/MIS Supervisory	132	8.4%
DP/MIS Staff	61	3.9%
Sub-Total	1,287	81.7%
Company Management		
General and Corporate Management	108	6.9%
Financial Management	104	6.6%
Administrative Services Management	66	4.2%
All Other	10	0.6%
Sub-Total	288	18.3%
Total Respondents	1,575	100%

the 1,539 who use or plan to use datacomm, 56.1 percent plan to add one or more of the 12 types of products/services.

Terminals (94.8 percent), modems (90.2 percent) and printers (89.4 percent) lead the list of most frequently cited datacomm equipment. They also lead the list of items to be added. Interestingly, local area networks which ranked 12th of the products and services in use jumped up to seventh among those to be added.

Those planning or using datacomm were asked to rate the importance of 12 factors when purchasing equipment or services. The top-ranked factor was the reliability of the product. It was closely followed by the product performing according to its specifications. Availability and speed of repair services came in third.

Price rated 11th on the list and whether or not the supplier can provide a complete system rated 12th. The appeal of advanced technology may be tarnishing somewhat as users search for viable solutions, not fancy ones. The supplier's reputation for advanced technology rated 10th.

In line with hoopla in the marketplace, those using datacomm were asked to indicate the extent that their company has started to integrate data with voice communications. Of the 1,440 users of datacomm, 99.3 percent answered the question.

Nearly 80 percent answered that they have little or no activity underway to integrate voice and data. Fifteen percent said they have moderate activity, although in companies with 1,000 or more employees, that figure moves up to 24.2 percent. Three percent of the respondents said they have extensive activity and 1.7 percent said they have completed the integration. (IN)

Types of Data Communications Systems Being Used

	Presently Have		Don't Have Now But Plan to Add In Next 12 Months		Total that Have or Plan to Add In Next 12 Months	
	No.	Percent	No.	Percent	No.	Percent
Local Systems (on-site, campus)	1,176	74.7%	133	8.4%	1,309	83.1%
Metropolitan Area Systems	496	31.5%	127	8.1%	623	39.6%
Long Distance Systems	859	54.5%	175	11.1%	1,034	65.6%
Total-One or More Systems	1,440	91.4%	338	21.5%	1,539	97.7%
Total Respondents	1,575	100%	1,575	100%	1,575	100%

Copies of the complete 200-page study are available for $295 from Hitchcock Marketing Research, Hitchcock Building, Wheaton, IL 60188. The study includes an Executive Summary, complete tabulated data and cross-tabulations by industry, company size, and types of datacomm systems used.

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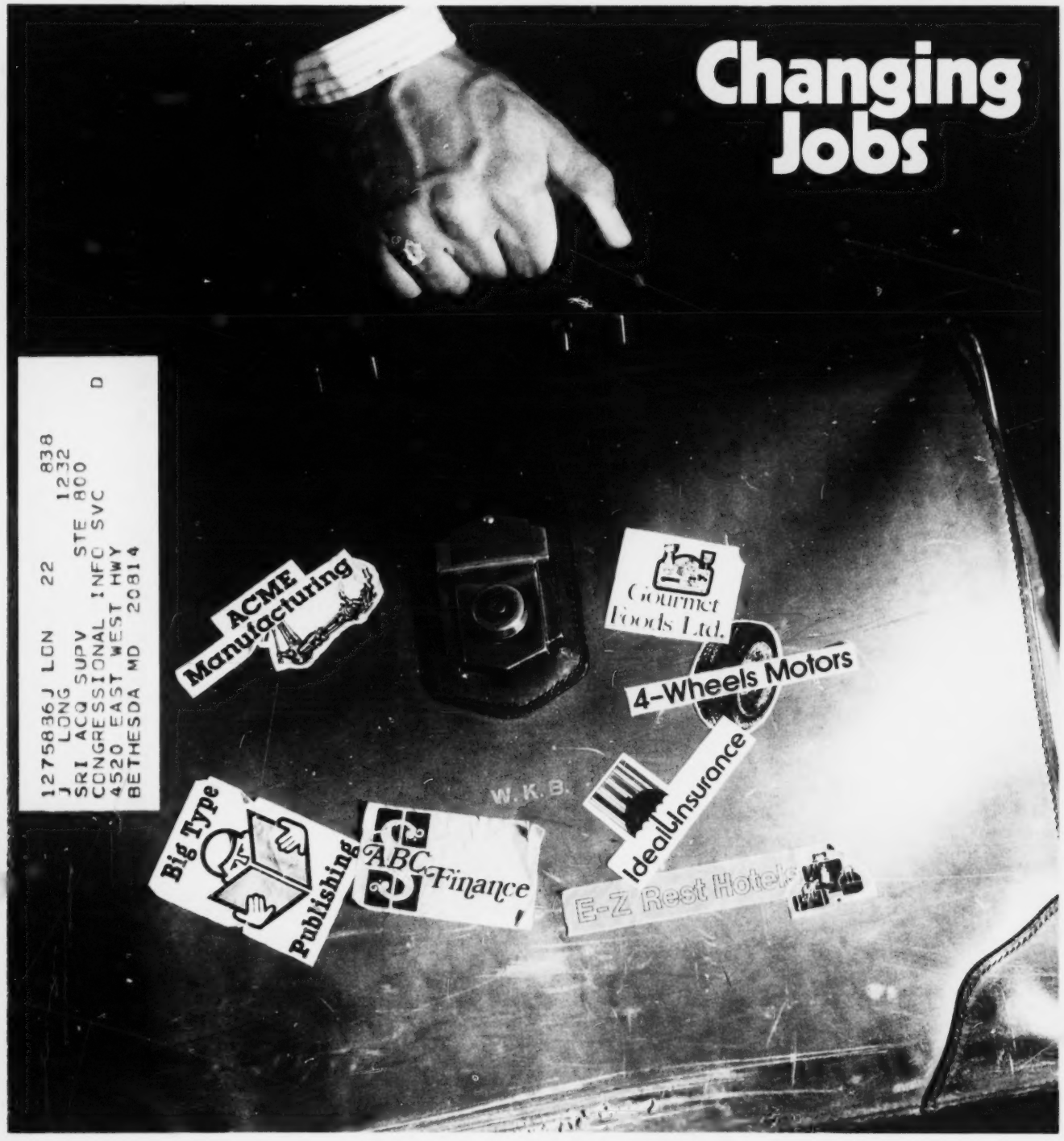

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Microcomputers

Does IBM get help from MIS in 'selling' to top corporations?

Could it be that data processing (DP) professionals and management information systems (MIS) executives are somewhat responsible for the IBM PC's phenomenal success in the Fortune 1000 companies? Harold Kinney, vice president of Future Computing of Richardson, TX, sees a connection.

"There's no doubt that data processing and MIS people are the single most influential group in the corporation when it comes to deciding which personal computers will be accepted and supported," says Kinney. "And IBM and MIS go way back together, about 20 years to be exact."

Actually, Kinney says we may be observing something of a "cyclical effect," a trend feeding upon itself. The MIS executives may have made their original PC purchases based on the strength and comfort of the IBM name. But as IBM announced more PC compatibility with its mainframes, sales increased. And meanwhile, reinforcements have come from the rapid growth of the PC-compatibles market.

"It's hard to say who is influencing whom," says Kinney, "whether the DP/MIS support has made the IBM PC more popular in corporations; or whether the long-standing popularity of IBM has swayed the DP community and persuaded them to choose the PC over other brands." The truth is probably somewhere in between, he concludes.

At any rate, Kinney notes that compatibility with the IBM PC has become an unofficial standard for Fortune 1000 firms which will buy more personal computers in 1985 than were sold to all major US corporations before 1984.

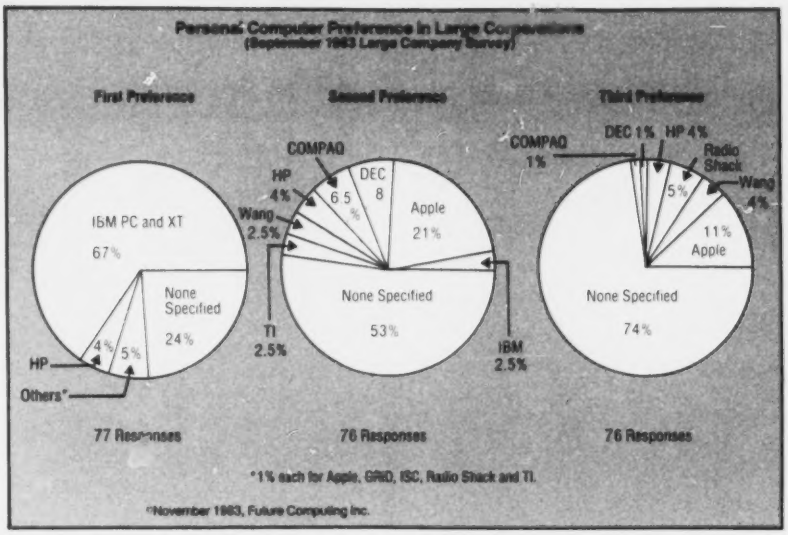
A recent study by the research firm of the 2,000 largest corporations found the IBM PC the leader in installed base (58 percent) and in average installation size (30 units per firm). Future Computing puts IBM's 1983 share of the large corporation market at 66 percent. By 1988, as more companies offer IBM PC-compatible units, IBM's share will drop to 60 percent. The PC-compatibles will have 30 percent of the market.

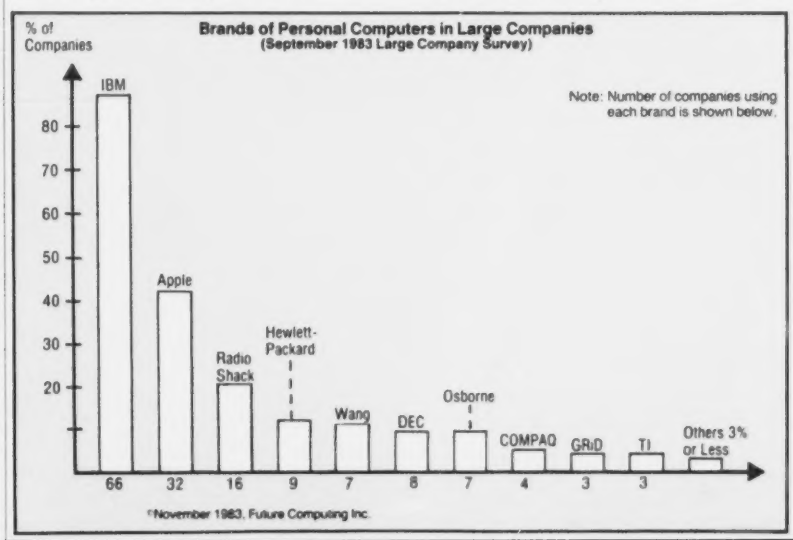
Kinney does not expect Apple Computer's recently introduced "Macintosh" to compete significantly with IBM. It is a "technologically delightful machine," he says.

"The Macintosh is not expandable; it has no color; and the keyboard is not as good as it should be," notes Kinney. "However, if Apple gives it MS-DOS windows and communications ability, it may go farther than we expect."

On the other hand, Kinney thinks the new Hewlett-Packard (HP) 150 personal computer will be a machine to watch. It represents a "strong departure" for HP and is being marketed as it should be, he says. He speculates that one thing that may spur sales for the new system is that Hewlett-Packard, like IBM, has the confidence of many MIS professionals.

—WLM





Sanyo, Toshiba top spreadsheet ratings

The popularity and relative low cost of microcomputers, combined with the electronic spreadsheet, have given financial planners a powerful new tool. For this reason, Auerbach Publishers, Pennsauken, NJ, has expanded its microcomputer ratings series to include electronic spreadsheet applications.

Info Industry

Datacomm market may soon see some 'fundamental dislocations'

A new report on deregulation from Strategic Inc. warns that the data communications market may soon see some "fundamental dislocations" stemming from the breakup of AT&T that will not only rattle the market but will cause headaches for the user community.

Strategic President Michael Killen explains that deregulation has caused an extremely unstable marketing environment due to a major realignment of equipment distribution channels and a restructuring of how services are provided to the customer. He also thinks that Congress has "virtually ignored" many of the public policy issues raised by deregulation such as the concept of universal service (the right of everyone to have access to the phone at a reasonable price) and the quality of networks.

Killen fears the quality of networks is now likely to deteriorate to the point that the user may hear static, the fading in and out of voices, and broken sounds on the line.

"There's probably going to be a reduction of quality when Bell Telephone no longer switches all the calls," says Killen. "As MCI, Sprint and others compete for Bell's old customer base, the quality will deteriorate to the point that users will look around more intensely for their needed transmission services, and will become more selective in their choice of vendors."

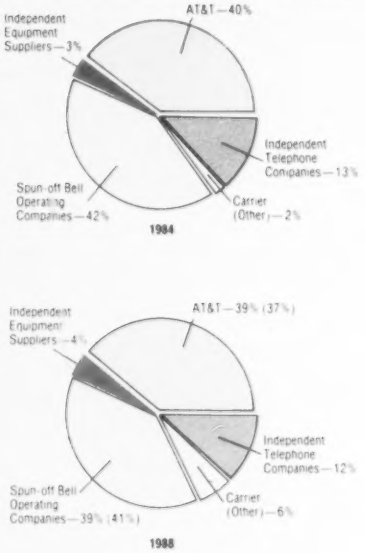
One of the "fundamental dislocations" that Killen identifies is a change in the way things are built. For example, in the past, telecommunications equipment was built to have a long life cycle, with an emphasis on quality. That's because the telephone industry bore the responsibility for universal service and thus wanted to avoid the expense of as many service and repair calls as possible.

Now, the emphasis is on price, which Killen thinks may cause some manufacturers to dislocate jobs to Hong Kong and other places of low-cost labor. Thus there will be not only a lower quality of equipment, but possibly an upheaval in the job market.

And some new jobs may emerge. Killen predicts that there will be a new classification of professionals in the large corporation charged with analyzing telecommunications and data communications needs for the company.

"There will soon be such a quantity and complexity of choices that someone will be needed to study the problem full-time," says Killen.

Relative Shares in Communications Market



Source: Strategic Inc.

Meanwhile, as many people leave AT&T and Bell Telephone, the unions will find themselves with fewer members. This may have a positive effect on the old-line work force.

"It wouldn't surprise me to see the unions putting pressure on their workers to be more productive and to accept automation," notes Killen.

Still another dislocation may be in the area of price. As the price of local services goes up, and the cost of transporting data becomes higher, people may start investing more money in local storage equipment and faster modems, so that data can be transferred more quickly.

But perhaps the major influence that will drive this market for the rest of the decade will be the tremendous proliferation of end-user equipment. Killen foresees that there will be a growing hodgepodge of ill-matched equipment, while users are trying to transmit and communicate more and more with everyone else.

"If Bell doesn't act fast enough, we might see a big corporation like IBM buying a cable TV company, just to make sure that its end users can communicate," says Killen. —WLM

For more information on this report Enter No. 7 on the Reader Information Card.

Software

Researcher develops text-oriented DBMS

How are xerography, typing correction fluid, protective tiles for the space shuttle, and a relational data base management system (DBMS) called DM related? All these things have been developed by Battelle Columbus Laboratories, the Ohio-based division of the renowned, independent research organization, Battelle Memorial Institute.

Battelle, which was founded as a nonprofit organization through a grant from a will, must bring in revenues to fund further research and to pay real estate and other taxes. A year ago, Battelle established a Software Products Center (SPC) under Mike Tickson as a commercial venture to market, sell and support software developed and used successfully within the organization.

DM (Data Management system) is the first software product introduced under the auspices of the SPC. It is not, however, the first software product developed by the organization.

Battelle's Basis was developed in 1969 as a project for the federal government. Tickson describes Basis, "a fairly mature system," as a completely English language, high-volume text retrieval system that allows single-key retrieval of millions of records almost as quickly as other systems retrieve thousands.

It is used by a large number of Fortune 500 companies, the information services industry, government agencies and publishers. "And it is the top system in litigation support," says Bill Griffith, manager, Basis products office.

Tickson pointed out to INFOSYSTEMS that Basis and the new DM system "are two completely different products except for textual strengths. Many DBMSs come from the other end of the spectrum, managing numerical data, but DM has a strong orientation toward text."

A real coup for Battelle was Control Data Corp.'s (CDC) decision to license DM for use with its new line of virtual machines to be announced later this year. Tickson explains, "Having developed products in-house for Battelle's own use, we suspected that our internal review of DM might be biased." But DM was checked out by CDC's

INFOSYSTEMS' 14th Annual Micrographics Usage Survey

MIS COMmand Grows

MIS/DP departments report increased responsibility in micrographics operations and system design.

By Karen G. Beagley and Wendelin J. Colby
Assistant Editors

Management Information Systems/Data Processing (MIS/DP) departments report increased levels of responsibility in micrographics operations and system design, according to INFOSYSTEMS' 14th annual survey of micrographics usage.

Nearly 70 percent of the respondents indicated that MIS/DP is in charge of micrographics operations in their organizations. Over 68 percent report that MIS/DP is primarily responsible for designing their micrographics systems. Another 66.3 percent said MIS/DP recommends which equipment will be purchased.

Usage increases

The survey conducted by Hitchcock Marketing & Research Services, Wheaton, IL, was mailed to 7,460 persons last December and received 1,969 replies, a 26.4 percent retur... Of the respondents, 34.4 percent currently use micrographics.

One respondent noted that effective micrographics is preceded by improved records management. Most companies seem to be moving to the micrographics area as costs go down. Another respondent stated, "We would like the convenience of our own COM system; however our volume does not justify the cost as we are a small company. The service company provides our size film — a valuable service."

About 19 percent of the respondents said the user group designs the micrographics system, followed by 12.5 percent reporting that this is a service bureau's responsibility. Micrographics vendors themselves design the system 9 percent of the time. This represents a decline from 13 percent of the cases last year.

The office services staff shows more influence in recommending equipment type (14.8 percent) than in designing systems (10.2 percent) or in taking charge of operations (11.9 percent).

Who Is in Charge of the Micrographics Operation

	1979 %	1980 %	1981 %	1982 %	1983 %	1984 %
DP Department	38.8	47.0	39.5	39.7	41.2	47.3
Management Information Systems (MIS)	*	*	13.1	16.3	20.0	22.5
User Group	13.6	18.5	23.1	21.4	18.5	14.3
Records Manager	11.2	16.5	12.8	16.0	14.6	13.0
Office Services Staff	16.8	19.7	13.4	10.8	13.5	11.9
Micrographics Dept.	6.3	11.5	7.1	10.4	8.1	8.4
Systems Group	4.9	6.7	5.6	5.0	5.6	3.3
Other	19.0	15.6	11.9	14.9	12.3	9.9

*In 1979 and 1980, the MIS Department was not included, but the DP figure could be considered the combination of DP and MIS.

Concerning approval of expenditures, financial management (31.2 percent) has moved ahead of President/Vice President/General Manager/Chief Executive Officer (29.4 percent) this year for the first time since 1981. MIS/DP involvement combined has increased its role in approvals to 46.2 percent from 41.2 percent last year.

Who Designs the Micrographics System(s)

	1979 %	1980 %	1981 %	1982 %	1983 %	1984 %
DP Department	43.6	47.3	36.3	32.8	38.4	43.9
Management Information Systems (MIS)	*	*	16.1	20.5	20.0	24.3
User Group	21.1	23.9	21.1	19.8	18.9	19.4
Service Bureau	9.4	8.7	8.3	8.9	9.5	12.5
Records Manager	13.2	15.7	10.4	16.9	11.6	12.1
Systems Group	19.4	21.5	12.8	18.9	15.5	11.2
Office Services Staff	17.8	16.7	13.7	10.5	10.5	10.2
Micrographics Dept.	12.6	13.1	8.6	12.3	8.4	9.3
Vendor	10.8	10.5	12.5	10.9	13.0	9.0
Consultant	5.5	5.8	4.5	4.1	4.2	2.6
Engineering	6.3	4.4	4.8	5.7	5.5	2.6
Other	11.5	11.3	8.0	11.4	6.5	6.1

*In 1979 and 1980, the MIS Department was not included, but the DP figure could be considered the combination of DP and MIS.

Who Recommends the Type of Micrographics Equipment to Be Purchased

	1979 %	1980 %	1981 %	1982 %	1983 %	1984 %
DP Department	35.0	45.2	32.9	32.6	36.9	40.7
Management Information Systems (MIS)	*	*	14.2	18.4	22.0	25.6
Office Services Staff	16.9	19.8	18.8	11.2	13.1	14.8
User Group	16.0	16.4	19.1	17.0	18.5	13.4
Service Bureau	3.9	5.5	7.4	3.0	12.7	13.0
Micrographics Dept.	12.5	14.6	8.9	12.4	9.5	10.3
Records Manager	11.2	15.0	12.6	16.8	10.8	10.3
Systems Group	13.3	15.0	9.5	11.2	9.7	6.8
Consultant	3.6	3.5	2.8	3.5	5.6	5.1
Purchasing Department	10.4	10.7	5.8	9.1	2.4	2.9
Other	13.1	14.4	11.7	13.5	6.9	7.9

*In 1979 and 1980, the MIS Department was not included, but the DP figure could be considered the combination of DP and MIS.

Banking leads other industries in micrographics usage at 82 percent. Construction, manufacturing, communications, retail and financial industries reported usage more than 70 percent of the time.

Archival storage continues to be the single largest application of micrographics with 46.6 percent. Active or daily reference follows at 31.5 percent and semi-active reference at 21.9 percent.

Although about 60 percent of the respondents indicated they would maintain their present systems during 1984, 27 percent of the respondents said they would expand in applications such as converting to microfiche and purchasing their own equipment.

Types of services

About 40 percent of the respondents said all their micrographics needs are handled by service organizations. Ten percent said most of their needs are handled through a service bureau and another 11.9 percent said most of their work is split between in-house and a service bureau. Nearly 17 percent handle all their micrographics needs in-house leaving about 83 percent to use a service bureau to some extent.

Computer-output-microfilm (COM) dominated the types of micrographics services being used. Seventy-two percent of the respondents use magnetic-media-to-film-conversion. Filming documents is the second most popular choice at 36 percent. Nearly 67 percent of the respondents do not have COM equipment in-house, but 13 percent plan to install equipment within

Who Approves Micrographic Expenditures from a Budget Standpoint

	1979 %	1980 %	1981 %	1982 %	1983 %	1984 %
Financial Management	24.7	34.2	35.0	27.4	27.7	31.2
President/VP/GM/CEO	39.7	34.2	32.6	36.6	33.6	29.4
DP Management	NI	31.7	29.7	20.0	25.2	27.0
User Department	32.3	22.0	24.0	24.1	22.9	20.3
MIS Management	NI	*	*	12.9	16.0	19.2
Micrographics Dept.	NI	9.3	4.2	6.2	4.4	5.1
Other	18.3	9.8	7.7	10.8	10.5	8.7

*In 1980 and 1981, the MIS Department was not included, but the DP figure could be considered the combination of DP and MIS.

Average Approximate Expenditures on Micrographics in the Next Year

Film	1979	1980	1981	1982	1983	1984
No. Spending $1 >	56.5%	60.7%	45.7%	NA	41.1%	47.7%
Average Dollars	$17.0	$23.5	$16.9	$22.2	$24.4	$ 44.7
Equipment						
No. Spending $1 >	46.3%	52.2%	42.6%	NA	33.3%	35.0%
Average Dollars	$32.9	$32.2	$23.9	$37.9	$36.2	$ 41.6
Supplies						
No. Spending $1 >	53.7%	57.4%	41.1%	NA	26.7%	41.9%
Average Dollars	$ 7.3	$13.2	$ 9.4	$ 9.0	$18.6	$ 18.6
Services						
No. Spending $1 >	78.7%	75.0%	72.1%	NA	71.1%	77.8%
Average Dollars	$14.8	$23.9	$17.2	$19.6	$28.5	$ 26.2
Micrographics Salaries						
No. Spending $1 >	NI	NI	32.6%	NA	34.4%	29.2%
Average Dollars	NI	NI	$50.0	$76.6	$51.6	$123.3
Total For Next Year						
No. Spending $1 >	100%	100%	100%	100%	100%	100%
Average Dollars	$42.1	$56.6	$50.5	$85.6	$79.0	$100.1

Average Approximate Expenditures on Micrographics in Past Year

Film	1979	1980	1981	1982	1983	1984
No. Spending $1 >	55.3%	59.5%	43.3%	NA	35.4%	46.1%
Average Dollars	$16.0	$19.5	$13.0	$15.9	$20.4	$ 37.2
Equipment						
No. Spending $1 >	49.2%	54.9%	45.4%	NA	31.6%	35.9%
Average Dollars	$23.2	$25.7	$18.3	$35.3	$34.6	$ 33.7
Supplies						
No. Spending $1 >	51.9%	55.9%	36.2%	NA	24.5%	40.8%
Average Dollars	$ 6.6	$10.7	$ 8.5	$14.5	$14.7	$ 17.3
Services						
No. Spending $1 >	80.7%	74.5%	70.9%	NA	70.3%	79.3%
Average Dollars	$16.5	$19.7	$15.4	$17.3	$24.6	$ 26.5
Micrographics Salaries						
No. Spending $1 >	NI	NI	27.7%	NA	30.2%	27.4%
Average Dollars	NI	NI	$40.8	$62.8	$44.5	$113.3
Total For Past Year						
No. Spending $1 >	100%	100%	100%	100%	100%	100%
Average Dollars	$37.6	$46.4	$39.2	$74.2	$63.9	$ 88.3

How Micrographics Are Used

Active or Daily/Reference	1979 %	1980 %	1981 %	1982 %	1983 %	1984 %
Percent Using (1% >)	NI	NI	75.2	83.9	75.9	78.0
Average % (Incl. 0)	NI	NI	34.3	40.9	31.2	31.5
Semiactive Reference						
Percent Using (1% >)	NI	NI	80.3	79.5	80.6	80.9
Average % (Incl. 0)	NI	NI	25.3	24.2	24.4	21.9
Archival Storage						
Percent Using (1% >)	NI	NI	81.9	84.1	88.5	90.9
Average % (Incl. 0)	NI	NI	40.4	34.9	44.4	46.6

Planned Usage of Micrographics in the Next Year

Evaluate Its Potential Use	1979 %	1980 %	1981 %	1982 %	1983 %	1984 %
Yes	32.6	34.1	28.3	29.7	28.5	33.0
No/No Answer	67.4	65.9	71.6	70.3	71.5	67.0
Install Micrographics						
Yes	5.8	5.8	1.4	3.8	3.7	5.4
No/No Answer	94.2	94.2	98.5	96.2	96.3	94.5
Use A Service Bureau						
Yes	NI	NI	4.8	3.9	6.4	6.9
No	NI	NI	79.5	96.1	93.6	93.1

two years. About 19 percent already have COM equipment in-house. One respondent reported that using an outside service for microfiche caused "nothing but headaches and problems until we brought it in-house."

Computer-assisted retrieval systems (CAR) show an opportunity for growth. About 28.5 percent of the respondents may use CAR in two to five years and 3.8 percent within one year. Over 10 percent of the respondents presently use such equipment in-house. A standalone retrieval unit is the most popular method. More than 60 percent of the respondents use it.

Computer Disks/Computer Data Bases lead in alternate means in which to store documents at 39.1 percent. Laser disks, video disks and magnetic tape also hold a share of the market at 17.4, 15.2 and 13 percent respectively.

Paper is being used by 39.1 percent of the respondents for active, 41.2 percent for semiactive and 39.5 percent for archival storage. Computer Disks/Computer Data Bases come in second at 34.5 percent for active use. But for both semiactive and archival storage, central filing ranks second with 37 and 36.3 percent respectively.

Most of the respondents believe that micrographics does indeed help them in their offices. One company even created two new offices with the space saved from the paper storage and improved the procedure of locating records.

Not everyone sees micrographics as a growing trend, however. One respondent said, "Micrographics is a dead technology which has no future, including archival storage past 1990."

But another respondent claimed, "Our user departments were first reluctant to work with COM. Now they would have a difficult time going back to hard copy." (IN)

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How Micrographics Needs Are Handled

	1979 %	1980 %	1981 %	1982 %	1983 %	1984 %
All Handled by a Service Organization	32.5	30.3	34.7	30.5	36.0	39.8
Most In-House	20.3	20.8	14.9	19.6	14.9	21.6
All In-House	23.7	23.3	21.0	29.6	24.0	16.7
Equal Split Between In-House and Outside	11.8	13.3	14.9	10.2	12.0	11.9
Most at a Service Organization	11.8	12.3	14.6	10.2	13.2	10.0

Types of Micrographics Services Used

	1979 %	1980 %	1981 %	1982 %	1983 %	1984 %
Magnetic-Media-To-Film-Conversion (COM)	71.3	74.4	45.8	61.1	69.3	71.1
Filming Documents	36.1	39.0	41.7	41.0	41.2	36.2
Processing Film	28.5	35.0	37.5	29.3	26.6	27.8
Duplicating Film	24.8	26.9	37.5	24.4	24.6	24.0
Storage	6.6	8.2	16.7	7.1	7.3	6.8
Magnetic-Media-To-Paper Conversion	2.7	2.2	8.3	4.6	5.6	4.1
Film-To-Paper Conversion	4.5	4.0	20.8	5.7	7.0	3.6
Other	NI	NI	NI	4.2	2.0	1.9

Computer-Output-Microfilm (COM) Usage In-House

	1979 %	1980 %	1981 %	1982 %	1983 %	1984 %
Yes, In-House	16.9	20.4	10.9	20.9	16.1	18.6
No, But Plan To Have Within Two Years	6.8	7.2	8.4	12.7	14.5	13.1
No, And Do Not Plan To Have	66.3	72.4	74.6	61.6	68.2	66.8
No Answer	0.0	0.0	6.1	4.8	1.2	1.5

Other Methods to Store Documents

	Now Being Used %	Considering Using %
Paper/Hard Copy/ Computer Printouts	37.3	21.7
Central Filing/ Filing Cabinets	36.4	17.4
Magnetic Tape	29.5	13.0
Computer Disks- Computer Data Base	27.5	39.1
External Warehousing/ Off-Site Storage	3.8	4.3
Word Processing System	2.3	4.3
Optical Memory System/ Photo-Optic	2.0	21.7
Electronic Report/ Retrieval System	1.4	8.7
Laser Disk	1.4	17.4
Data Base Management Systems	1.2	2.2
Automated Records/ Management System	0.9	4.3
Video Disks	0.6	15.2
Computer Interactive Graphics	0.6	2.2
Engineering Drawings	0.6	0.0
Federal Records Center	0.6	0.0
Vendor Systems	0.3	0.0

Computer-Assisted Retrieval Systems (CAR) Usage

	1979 %	1980 %	1981 %	1982 %	1983 %	1984 %
Yes, Presently Use	8.5	9.4	7.0	12.3	12.4	10.3
No, But Plan To Use Within One Year	4.0	5.1	3.9	5.9	3.7	3.8
No, But May Use In 2 To 5 Years	29.6	31.1	31.8	30.3	27.7	28.5
No, And Do Not Plan To Use	43.8	42.7	46.1	41.8	49.5	51.8
Do Not Know What It Is	7.5	7.6	6.1	6.2	5.1	4.0
No Answer	6.5	4.1	5.0	3.5	1.6	1.5

Complete Reports Available

Complete spiral-bound copies of the backup summary of the survey are available for $50. This shows a detailed breakdown, by industry, for each of the 19 questions asked on the survey. Check or company purchase order must accompany all orders. Mail request to INFOSYSTEMS Micrographics Survey, Research Department, Hitchcock Publishing Co., Hitchcock Building, Wheaton, IL 60188.

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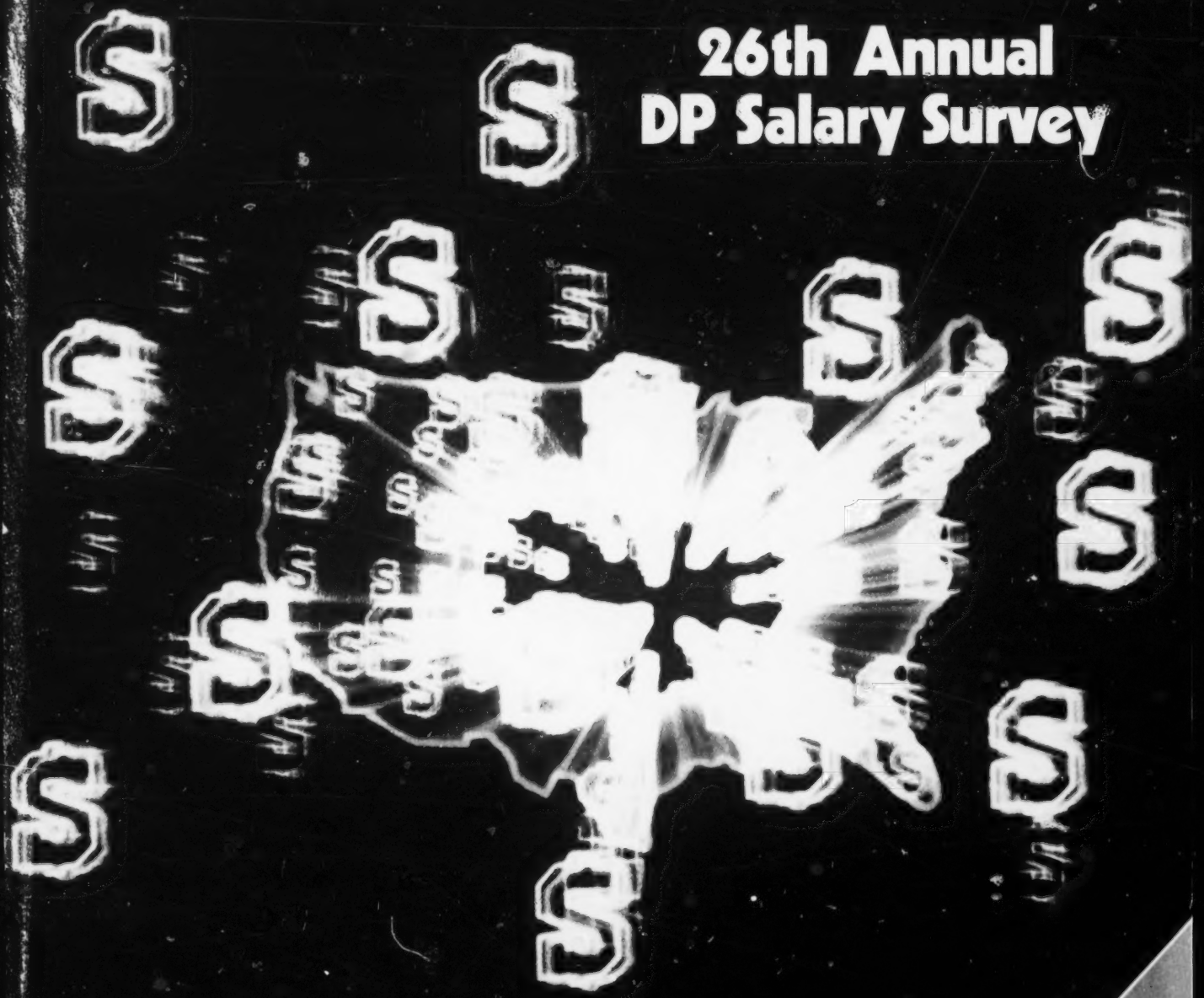
Part 1

26th Annual DP Salary Survey



Producing Viable MIS Reports

The Digital Connection

Is Information Center the Best Answer?

Computing Chrysler's Profitability

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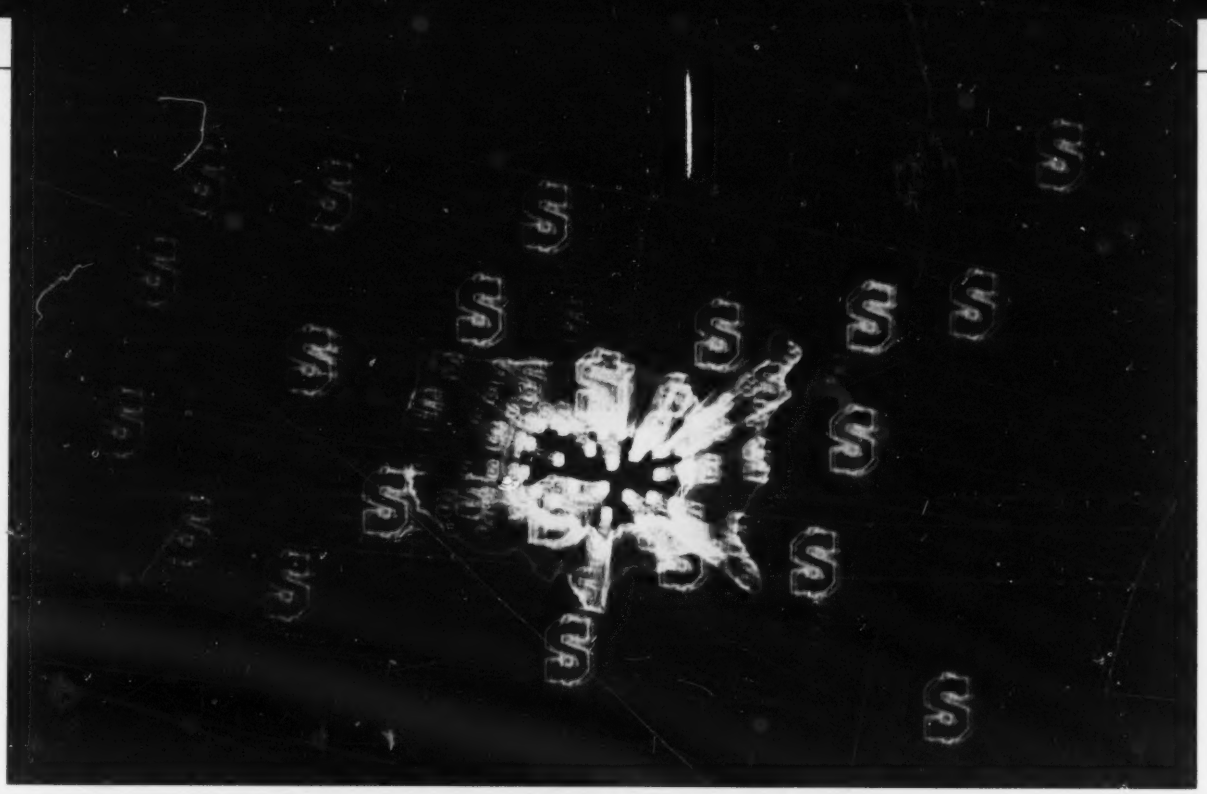


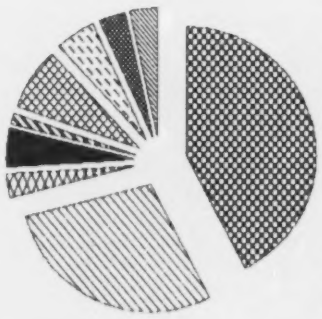
26th Annual DP Salary Survey

On the Rise Again

Salaries are beginning to mirror the rising economy judging by responses to INFOSYSTEMS' 26th Annual Survey.

By Karen Beagley, Associate Editor
and Raymond S. Winkler
Manager of Market Research, Hitchcock Marketing Services

Average Percent of 1984 DP Budget



-Personnel	42.50
-Hardware & Maintenance	28.40
-Systems Software	3.10
-Applications Software	4.90
-Maintenance Software	1.50
-Supplies	7.80
-Outside Services	5.00
-Data Communications	3.30
-Other	3.50

TOTAL: 100.00

Data processing (DP) salaries increased 6.9 percent from 1983 to 1984, according to INFOSYSTEMS' 26th Annual Salary Survey. This increase indicates that salaries are beginning to rise again with the improving economy. Salary increases are still down, however, from 1981 when a 12.8 percent boost was reported. Last year's salary survey reported an increase of only 5.1 percent.

INFOSYSTEMS' 1984 survey is based on responses from 972 firms drawn from the top 50 US metropolitan areas according to computer installations and usage. The respondents reported on salaries (excluding benefits and bonuses) for 10,581 full-time positions. These salaries were in effect on March 1, 1984.

In addition to salary information, the survey—which was conducted by Hitchcock Marketing Services, Wheaton, IL—gathered information about several other budgetary and computer opera-

tions matters. For instance, the salaries for the three largest metropolitan areas were broken down by city and suburbs. It showed an average 7.1 percent difference between the two locales within each area. New York City reported the widest disparity at 13.1 percent higher in the city. Los Angeles showed the smallest difference at 3.3 percent higher in the city. Chicago reported 6.9 percent difference, city over suburbs.

In 1979, only 5.4 percent of the respondents stated that the DP manager reported to a director of information systems. This year, the number indicating such a relationship reached 11 percent. That represents a 104 percent increase in the use of the title—and probably indicates the increased importance of computing to the organization.

A similarly impressive growth was shown in the area of data base management activities. In 1979, 15 percent of the respondents said the person responsible for the activity reported to the director of information systems. In 1984, the number had reached 27.2 percent. That figure has manifested consistent growth through the six-year period.

The survey reported a reduction in the average number of employees in the DP department over the past six years. These reductions follow the periods in which the economy was down, especially in 1982 and 1983. The same trend is reflected by the total number of employees in those organizations. The interesting statistic, however, is that in 1979, DP represented just over 1 percent of the employees in an organization. In 1984, the number was closer to 2 percent.

In the breakout of budget items, personnel still commands the lion's share at 42.5 percent. Other items and their percentages are as follows: hardware (and maintenance) 28.4; software, 9.5; supplies, 7.8; outside services, 5; and datacomm, 3.3.

Software has shown a significant increase in its share of the budget over the years. That 9.5 percent reported this year represents a 61 percent rise since 1981 when it took up 5.9 percent of the budget.

This year, for the first time, the survey broke software expenditures into three categories: systems software, applications and maintenance. Applications took the largest share of the pie by far at 52 percent. Systems expenditures came in at 33 percent of the budget and maintenance at 16 percent.

The budget shares of personnel and hardware have held surprisingly steady through the years. In 1979, respondents reported personnel consuming 43.8 percent of the budget; in 1984, 42.5 percent. Hardware claimed 29.6 percent in 1979 and 28.4 percent this year; that does, however, represent the lowest figure ever reported on hardware.

An average 11.7 percent of new employees were reported on staffs due to turnover in existing positions. More than two-thirds of the respondents said that turnover was about the same as previous years. Seventeen percent considered it a decrease and 14 percent called it an increase over prior years.

Nearly 26 percent of the respondents stated that they have one or more unfilled salaried, nonclerical DP positions. The average number of positions unfilled was 2.3.

INFOSYSTEMS asked the questionnaire's recipients to rate eight sources for finding DP personnel. Promotion from within the DP department itself was the clear winner. The second and third choices, respectively—and significantly ahead of others on the list—were referrals and advertisements.

On average weekly salaries, the largest increase was reported among systems analysts. The top ranking among four categories received a 16.1 percent increase over last year. The next highest growth came among applications programmers at 14.7 percent compared with 1983. The systems analyst salary was $799 per week; the applications programmer, $709. Systems programmers also had a healthy increase at 11.1 percent to $743 per week.

The top DP management position reported a 7.3 percent increase over 1983 to $1,029 per week. Some areas of systems programming, datacomm and data entry showed decreases, but all had shown substantial increases between 1982 and 1983.

The highest reported annual salary for the top information systems official is $96,000. That is being paid to a Vice President of Operations. That salary does not have a maximum range, by the way. The highest salary paid to someone with an information systems title is $70,000, paid to an MIS Director. That respondent said the maximum salary is $80,000. (IN)

Number of Employees In DP vs. Company
(By Equipment Rental)

Rental Range Per Month	Average Number In DP	Average Number In Company
Under $3,000	3.5	186.4
$3,000 to $4,499	4.7	248.7
$4,500 to $5,999	5.4	421.4
$6,000 to $8,599	5.9	439.0
$9,000 to $11,999	7.9	549.8
$12,000 to $14,999	10.7	610.8
$15,000 to $17,999	12.4	677.5
$18,000 to $24,999	16.9	970.0
$25,000 to $49,999	21.0	1990.3
$50,000 to $74,999	27.4	2287.2
$75,000 to $99,999	35.1	2362.9
$100,000 to $149,999	63.2	3605.8
$150,000 or more	244.8	14259.0
Not available	9.4	155.0
All companies	20.2	1343.9

Sources of Finding DP Personnel (In order of importance)

Rank	Source
1	Promotions within DP
2	Referrals
3	Advertisements
4	Retraining-upgrading other workers
5	Personnel agencies
6	Colleges & universities
7	Other departments
8	Computer schools
9	Other

Job Descriptions Available

Detailed job descriptions for the 35 DP positions surveyed are available free of charge. For a copy Enter No. 450 on the Reader Information Card.

Additional Reprints

Additional copies of the DP Salary Survey in this issue are available for $7.50 each. In quantities of 10 or more, the cost is $5. Send your check or company purchase order to Hitchcock Executive Book Service, Hitchcock Building, Wheaton, IL 60188.

26th Annual DP Salary Survey

Average Reported Weekly Salaries for All Infosystems Jobs by Geographic Area

AVERAGE REPORTED WEEKLY SALARIES FOR ALL INFOSYSTEMS JOBS BY GEOGRAPHIC AREA

Job Description	Job Code	Region Area: New England ME, VT, NH, MA, CT, RI	Mid Atlantic NY, PA, NJ	So. Atlantic WV, MD, DE, VA, NC, SC, GA, FL, DC	East North Central WI, MI, IL, IN, OH	East South Central KY, TN, MS, AL	West North Central ND, MN, SD, NB, IA	West South Central TX, OK, AR, LA	Mountain UT, MT, ID, NV, WY, CO, AZ, NM	Pacific WA, OR, CA	National Average Comparison 1983	1984	% Increase Decrease	
MANAGEMENT		(41)	(152)	(130)	(206)	(24)	(65)	(87)	(40)	(158)	1,176	905		← (No. Firms)
Top MIS Official	(01)	1045	1059	955	991	921	1034	1177	871	1110	959	1029	7.3	
Data Base Systems	(02)	855	802	719	647	**	604	697	777	672	648	702	8.3	
Data Processing	(03)	697	751	737	689	631	691	748	748	732	670	721	7.6	
Ass't D.P.	(04)	606	635	688	575	**	500	680	676	684	627	663	5.7	
Project/Team Leader														
Leader	(05)	725	769	749	628	565	649	763	631	721	656	707	7.8	
Systems Analysis and Programming														
Manager/Supervisor	(06)	672	778	783	713	621	687	776	728	710	691	732	5.9	
Lead	(07)	632	676	667	549	515	593	634	602	663	567	613	8.1	
Senior	(08)	560	585	568	483	441	519	595	529	606	515	550	6.8	
Junior	(09)	487	466	475	428	348	403	497	450	498	408	445	9.1	
Systems Analysis														
Manager/Supervisor	(10)	**	673	870	808	**	**	**	730	821	688	799	16.1	
Lead	(11)	**	664	729	555	**	532	571	701	699	609	611	0.3	
Senior	(12)	488	587	662	530	479	508	529	563	673	570	591	3.7	
Junior	(13)	**	487	520	430	**	414	369	**	583	513	520	1.4	
Systems Programming														
Manager/Supervisor	(20)	777	744	769	642	626	771	823	**	808	669	743	11.1	
Lead	(21)	643	669	601	624	497	564	667	722	701	579	644	11.2	
Senior	(22)	581	541	574	524	447	505	589	623	689	526	573	8.9	
Junior	(23)	396	399	443	403	388	375	488	540	572	430	444	3.3	
Trainee	(24)	**	328	361	333	**	**	346	341	375	345	344	−0.3	
Applications Programming														
Manager/Supervisor	(25)	**	649	758	624	**	651	671	**	841	618	709	14.7	
Lead	(26)	**	577	550	504	425	500	512	519	704	524	545	4.0	
Senior	(27)	483	493	489	465	394	446	445	505	532	452	467	3.3	
Junior	(28)	416	417	397	383	387	337	389	434	427	364	392	7.7	
Trainee	(29)	345	337	295	340	234	317	382	356	397	308	339	10.1	
Data Communications														
Manager	(30)	**	719	566	672	557	**	565	**	563	619	612	−1.1	
Operator	(31)	**	448	373	374	**	**	326	418	384	367	390	6.3	
Computer Operations														
Manager/Supervisor	(32)	565	530	542	530	471	503	550	524	518	488	531	8.8	
Lead Operator	(33)	385	379	388	372	317	351	375	406	428	358	382	6.7	
Senior Operator	(34)	347	332	329	344	290	307	335	351	365	325	340	4.6	
Junior Operator	(35)	298	282	267	270	238	248	271	300	340	271	282	4.1	
I/O Control Manager	(36)	336	347	405	363	269	260	377	415	461	333	366	9.9	
Tape Librarian	(40)	317	305	319	280	**	225	295	313	369	282	301	6.7	
Key Entry														
Supervisor	(41)	407	367	359	365	256	328	379	334	414	330	362	9.7	
Lead Operator	(42)	294	302	299	293	246	263	300	289	380	274	294	7.3	
Senior Operator	(43)	284	259	255	274	222	254	268	254	342	253	277	9.5	
Junior Operator	(44)	217	215	234	226	218	226	222	220	239	222	218	−1.8	

** Indicates insufficient information available

Complete DP Salary Survey

A complete copy of the INFOSYSTEMS 1984 DP Salary Survey is available. The report includes replies to the 20 questions in the study by industry and by equipment rental range, as well as salary data for the 35 job functions broken out by major metropolitan areas. It can be ordered for $50. Send your check or company purchase order to Hitchcock Executive Book Service, Hitchcock Building, Wheaton, IL 60188.

26th Annual DP Salary Survey

Weekly Salaries for All Infosystems Jobs: Nationwide and by Size of Installation

Job Description	Job Code	NATIONAL STATISTICS										AVERAGE SALARY—BY EQUIPMENT RENTAL RANGE													
		Number Reported	Lowest Reported Actual Salary	25th Percentile* Actual Salary	National Average Actual Salary	Median* Actual Salary	Mode* Actual Salary	75th Percentile* Actual Salary	Highest Reported Actual Salary	Established Salary Range—Average Low	Established Salary Range—Average High	Under $3,000/Mo.	$3,000-4,499/Mo.	$4,500-5,999/Mo.	$6,000-8,999/Mo.	$9,000-11,999/Mo.	$12,000-14,999/Mo.	$15,000-17,999/Mo.	$18,000-24,999/Mo.	$25,000-49,999/Mo.	$50,000-74,999/Mo.	$75,000-99,999/Mo.	$100,000-149,999/Mo.	$150,000 and over	— (No. Firms)
MANAGEMENT												(124)	(103)	(76)	(113)	(72)	(94)	(40)	(68)	(99)	(42)	(21)	(18)	(30)	
Top MIS Official	(01)	161	475	865	1029	961	961	1150	2308	852	1224	**	847	891	976	941	991	953	1012	1044	974	1319	1338	1202	
Data Base Systems	(02)	58	323	576	702	685	692	791	1250	594	858	**	433	557	471	635	695	**	812	718	744	816	850	745	
Data Processing	(03)	726	260	596	721	715	769	840	1336	610	854	588	610	635	683	717	738	744	781	832	864	868	894	968	
Ass't DP	(04)	124	225	553	663	663	663	769	1130	518	736	**	387	463	511	542	569	572	662	722	724	788	819	939	
Project/Team Leader																									
Leader	(05)	248	346	615	707	676	692	769	1115	572	827	632	**	**	595	553	607	658	648	696	687	813	743	743	
Systems Analysis and Programming																									
Manager/Supervisor	(06)	241	389	632	732	705	632	832	1384	592	858	664	659	624	607	639	632	603	772	757	742	848	888	710	
Lead	(07)	416	184	543	613	591	563	688	1033	500	712	524	547	550	524	521	598	559	609	639	592	739	670	605	
Senior	(08)	773	208	484	550	538	506	615	1019	451	645	443	477	489	523	511	517	513	526	585	546	617	553	539	
Junior	(09)	603	165	387	445	423	387	505	734	376	549	395	410	446	382	396	404	424	426	444	427	483	512	431	
Systems Analysis																									
Manager/Supervisor	(10)	22	575	673	799	787	961	932	1019	677	939	**	**	**	**	**	**	**	**	814	**	810	838	899	
Lead	(11)	211	326	505	611	600	495	701	986	549	781	**	**	**	**	**	595	**	778	695	692	661	743	704	
Senior	(12)	79	286	500	591	511	511	701	958	487	676	**	455	393	**	561	490	**	608	625	576	580	683	620	
Junior	(13)	122	269	424	520	556	600	600	692	420	580	**	**	**	307	**	485	**	568	547	518	528	553	537	
Systems Programming																									
Manager/Supervisor	(20)	98	325	669	743	742	692	846	1250	611	883	**	**	**	574	**	582	630	775	739	697	789	817	829	
Lead	(21)	111	390	579	644	621	590	717	995	534	769	**	**	**	474	550	544	585	713	654	603	695	692	661	
Senior	(22)	193	180	519	573	557	534	650	969	498	719	408	378	466	397	445	477	576	604	613	508	635	609	588	
Junior	(23)	132	201	375	444	465	465	518	703	394	561	**	260	279	317	274	393	395	376	461	431	506	535	475	
Trainee	(24)	76	266	294	344	326	326	365	519	346	495	**	**	**	**	**	302	**	294	**	374	**	382	322	
Applications Programming																									
Manager/Supervisor	(25)	57	346	525	709	673	673	846	1154	568	832	598	**	**	515	628	600	**	699	767	686	707	860	872	
Lead	(26)	137	230	451	545	519	480	610	906	450	614	579	495	471	490	468	494	566	577	626	**	651	678	661	
Senior	(27)	581	138	372	467	463	348	532	961	410	584	395	351	419	430	443	449	462	484	498	469	564	526	392	
Junior	(28)	559	165	326	392	384	313	442	663	335	473	344	307	349	332	382	368	344	423	385	435	490	428	340	
Trainee	(29)	259	143	278	339	326	278	415	542	305	422	**	299	246	268	262	291	316	358	302	315	391	364	364	
Data Communications																									
Manager	(30)	42	323	461	612	596	461	692	1150	545	759	**	**	**	334	**	**	**	621	568	602	743	624	719	
Operator	(31)	87	173	320	390	384	384	442	673	354	529	312	**	**	276	**	261	**	413	366	379	468	420	482	
Computer Operations																									
Manager/Supervisor	(32)	359	192	420	531	530	576	625	1096	455	649	410	395	432	448	445	499	443	557	549	602	668	638	632	
Lead Operator	(33)	474	165	309	382	365	384	439	807	313	449	320	333	316	314	373	348	325	392	393	380	400	480	469	
Senior Operator	(34)	871	174	288	340	332	346	375	650	284	398	302	306	291	307	338	305	309	359	335	364	343	372	388	
Junior Operator	(35)	685	126	240	282	276	282	315	650	240	334	265	249	240	244	265	256	244	291	281	295	294	306	323	
I/O Control Manager	(36)	181	160	288	366	315	315	425	972	334	476	273	230	**	336	419	352	252	375	384	360	487	464	373	
Tape Librarian	(40)	100	146	253	301	288	288	338	550	256	360	**	**	272	**	**	**	**	296	289	280	299	329	308	
Key Entry																									
Supervisor	(41)	181	200	311	362	341	313	410	692	309	434	300	301	326	303	362	336	309	345	395	393	412	421	431	
Lead Operator	(42)	343	122	265	294	288	265	323	525	252	352	268	253	304	283	281	280	259	286	301	303	337	354	355	
Senior Operator	(43)	963	126	238	277	262	249	310	494	226	315	255	243	248	257	274	256	250	264	281	276	287	281	321	
Junior Operator	(44)	358	108	182	218	215	182	246	500	201	276	224	197	232	231	200	203	208	247	215	234	245	251	261	

* *Median—A figure having an equal number above and below*
* *Mode—The salary reported most often*
* *25th Percentile—That point at which 25% of all other salaries are lower and 75% are higher*
* *75th Percentile—That point at which 75% of all other salaries are lower and 25% are higher*

** Indicates insufficient information available

26th Annual DP Salary Survey

Average Reported Weekly Salaries for All Infosystems by Industry

AVERAGE REPORTED WEEKLY SALARIES FOR ALL INFOSYSTEMS JOBS BY INDUSTRY

Manufacturing and Processing

Job Description	Job Code	Advertising, Printing & Publishing	Banks	Educational	Engineering, Construction	Governmental Agencies	Hospital, Health Care	Insurance	Financial	Retail Sales & Distrib.	Data Proc. Service Centers	Other Services (non-DP)	Transportation	Wholesale Sales & Distrib.	Electrical, Electronic	Food, Tobacco, Drugs	Machinery, Instruments, Equip.	Metal Producing & Fab.	Apparel, Textiles	Lumber, Wood, Furn., Paper	Chemicals, Petro., Coal	Rubber, Leather, Glass, Clay	Other
MANAGEMENT		(28)	(25)	(56)	(25)	(85)	(36)	(31)	(23)	(62)	(40)	(72)	(28)	(79)	(52)	(27)	(56)	(55)	(15)	(12)	(29)	(21)	(17)
Top MIS Official	(01)	1129	922	877	**	978	989	1157	1252	1108	972	1188	1108	1080	1015	**	1009	901	932	977	1076	768	903
Data Base Systems	(02)	720	**	667	**	729	647	**	614	**	682	677	**	659	**	**	**	625	**	**	**	**	**
Data Processing	(03)	710	735	677	745	760	712	712	811	704	677	718	770	656	769	699	705	692	808	711	791	658	793
Ass't D P	(04)	549	656	581	**	719	**	**	686	**	579	**	**	522	663	612	662	546	**	**	**	**	571
Project/Team Leader																							
Leader	(05)	673	696	639	692	727	680	699	673	732	640	559	780	596	845	**	707	614	622	641	**	**	**
Systems Analysis and Programming																							
Manager/Supervisor	(06)	727	664	597	**	759	763	698	825	740	704	665	794	758	792	**	749	676	617	718	759	668	738
Lead	(07)	631	653	500	585	626	557	621	700	654	590	598	699	592	731	668	613	596	591	582	709	575	568
Senior	(08)	533	587	493	569	526	481	541	609	551	515	537	640	505	642	509	544	526	510	495	603	505	527
Junior	(09)	406	517	360	471	410	381	446	492	455	362	391	544	424	497	383	374	435	418	411	528	475	417
Systems Analysis																							
Manager/Supervisor	(10)	**	**	**	**	874	**	**	**	865	**	**	**	**	**	**	690	**	**	**	740	**	**
Lead	(11)	**	**	510	**	782	**	653	**	**	**	**	741	586	**	**	594	557	**	576	688	**	**
Senior	(12)	**	**	495	**	638	576	497	**	576	484	503	625	528	**	595	523	506	546	**	586	**	**
Junior	(13)	**	**	418	**	481	387	**	**	**	**	471	586	384	369	**	**	**	**	**	**	**	**
Systems Programming																							
Manager/Supervisor	(20)	734	731	699	**	721	695	720	**	758	767	**	786	815	722	**	713	659	**	**	606	**	691
Lead	(21)	607	687	552	**	630	603	652	666	616	707	643	723	713	697	**	682	617	**	**	**	**	**
Senior	(22)	**	610	502	**	563	544	552	571	472	496	538	686	505	607	**	547	527	440	**	526	512	**
Junior	(23)	**	490	375	**	465	450	452	**	453	338	304	563	367	434	**	519	423	**	**	445	**	402
Trainee	(24)	302	**	**	**	323	**	**	**	**	317	**	**	368	**	**	**	325	**	**	**	**	**
Applications Programming																							
Manager/Supervisor	(25)	714	**	592	**	721	664	720	**	**	**	**	**	**	695	**	**	**	513	**	**	**	**
Lead	(26)	582	**	447	**	486	554	586	**	561	550	538	666	523	640	**	635	540	472	565	584	**	519
Senior	(27)	472	491	378	459	429	485	530	509	440	442	484	522	479	595	506	518	445	392	438	516	456	486
Junior	(28)	402	419	355	379	369	399	399	422	397	380	368	407	355	464	353	402	379	336	327	453	389	376
Trainee	(29)	325	315	261	294	283	251	357	387	308	336	303	385	323	419	336	349	297	304	**	429	**	**
Data Communications																							
Manager	(30)	**	**	517	**	554	**	**	508	612	552	684	**	**	**	**	571	**	**	**	**	**	**
Operator	(31)	**	410	**	**	386	**	**	363	303	**	430	441	427	481	**	**	**	**	**	**	**	**
Computer Operations																							
Manager/Supervisor	(32)	520	498	539	522	604	454	554	650	442	544	508	654	509	543	541	538	482	496	549	566	394	516
Lead Operator	(33)	380	367	351	378	429	380	406	420	346	362	367	569	354	452	440	367	359	338	406	434	304	382
Senior Operator	(34)	364	304	308	313	374	320	325	381	314	319	328	407	307	363	360	323	318	293	343	362	278	323
Junior Operator	(35)	321	237	245	271	315	278	283	311	258	220	260	394	278	292	275	272	268	245	269	281	224	261
I/O Control Manager	(36)	**	292	385	299	359	**	325	485	253	265	329	571	264	344	403	413	331	**	352	371	**	**
Tape Librarian	(40)	**	241	324	**	305	303	262	384	291	333	267	387	**	326	**	288	338	**	**	284	**	**
Key Entry																							
Supervisor	(41)	362	391	297	356	345	347	353	388	337	325	382	476	347	376	385	395	375	340	367	371	286	310
Lead Operator	(42)	291	292	280	330	280	313	281	325	288	255	266	387	277	342	315	305	324	246	309	321	247	286
Senior Operator	(43)	238	263	261	290	258	268	262	278	252	250	226	319	260	305	282	272	275	221	276	287	245	239
Junior Operator	(44)	226	218	226	200	206	207	189	199	225	181	220	223	221	266	218	237	215	194	241	250	220	209

(No. Firms)

** Indicates insufficient information available

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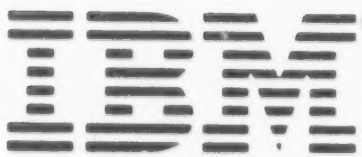

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Will Success Spoil IBM?

Snyders on Software: Then & Now

Data Center Housekeeping

Figuring the Bill for MIS Services

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Info Industry

Novel distribution channels may emerge for microcomputers

By 1985 computer retailers may be hard put to house the inventory of the more than 170 personal computer manufacturers now in business. According to Strategic Inc., a market research firm in San Jose, CA, there is an inadequate distribution system to cope with the substantial expected growth rate. Strategic expects the number of personal computers (PCs) shipped worldwide in 1982 (2.25 million) to double by 1985, thus forcing new distribution channels to open up over the next few years.

"The personal computer distribution chain is currently in a state of flux and is under pressure, due to the more than 645 different products now on the market," says Yves Blanchard, vice president of marketing for Strategic.

Blanchard foresees three novel new channels opening up as a result of this pressure, the first of which is the pyramid scheme. This involves a network of door-to-door salespeople selling computers like encyclopedias.

Another channel Blanchard expects to emerge on a widespread basis is what he terms "the PC supermarket." This would collect under one roof a variety of computer hardware and software sold by representatives of each system.

Still another method which might emerge is teleshopping: a giant central shopping and distribution mechanism similar to the merchandising channels now developing via teletext and videotex. More conventional channels will probably also be used to handle the escalating supply of personal computers.

For example, Blanchard expects the national or regional broker sales force to be successful in managing the surplus supply of systems. This procedure will require a salesperson to call directly on end users with complementary product lines from different manufacturers. Systems houses, too, could be effective distributors, especially those that support large corporations where the microcomputer acts as an intelligent terminal for the company's mainframe.

At any rate, both systems houses and retailers will likely expand sales efforts into horizontal and vertical markets during the next few years. Strategic identifies the particularly promising markets for PC growth as education, medical and pharmaceutical, accounting, banking, and legal areas. Although these markets will require customized software and a sales and support staff familiar with each vertical or horizontal market, Blanchard says that the effort in adding this capability will be well-rewarded.

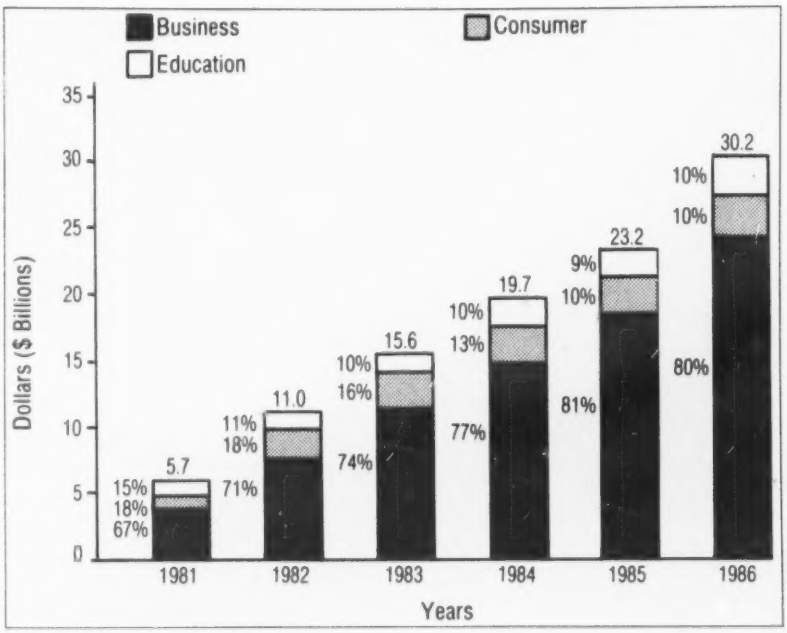

Exhibit 2.9—PC Marketing Growth by End Use 1981-1986 ($ Billions)

Source: Strategic Inc

The research firm's analysis of the microcomputer market shows that the lion's share will be made up of large corporation sales. The second largest market segment will be business and professional.

As for the consumer market, Strategic says that distribution of low-cost home computers is expected to go the way of video games and other consumer electronic products. Home computers will continue to be sold through established microcomputer retailers such as department, stereo, and radio and TV stores, as well as through new entrants such as discount, drug, jewelry, hobby, camera and certain grocery stores.

WLM

For more information on this report Enter No. 3 on the Reader Information Card.

Management

6 reasons why documentation is needed

"Documentation is vital in data processing because of the unforgiving nature of computers," says Emanuel Katzin, a Houston-based consultant. Leading a session at the annual Independent Computer Consultants Assn. conference, he pointed out six reasons why documentation is needed.

1. *Productivity.* Nontechnical users of computers can't be expected to remember all the necessary steps to perform computer functions. Documentation can provide necessary checklists of these functions.

2. *Reference.* Documentation is a source of detail about system operation for those who need it.

3. *Continuity.* Documentation is "life insurance" for the system in case design team members leave the company.

4. *Consistency.* Good documentation tells users how to input data accurately.

5. *Training.* If documentation will be used as a training tool, it should be

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4th Semiannual Microcomputer Software Review

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Trends

88% of white-collar workers report they are computer literate

Computer literate: One who can use or operate a computer or understand its capabilities.

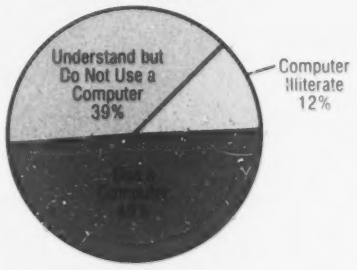
That's the way 88 percent of the white-collar workers polled described themselves in an end-user survey sponsored by Exxon Office Systems, Stamford, CT. Questionnaires were mailed to 5,000 middle managers during the last quarter of 1983; 464 were completed, representing a nine percent return.

Only 10 percent of those polled reported illiteracy. Some 49 percent of respondents use a computer. Another 39 percent have either had some training or are comfortable with their comprehension of a computer's capabilities and applications.

Survey findings also show a direct relationship between degree of computer literacy and positive attitudes about computers. For example, 82 percent of users agree that "computers make my life easier." Almost the same number of nonuser literates supported this evaluation. Forty-three percent of computer illiterates, however, thought computers made their lives easier.

People who use computers tend to use them frequently and for a broad mix of applications, according to the study. Seventy-eight percent of those who said they use computers use them daily; 19 percent use them weekly; and 3 percent use them less than once a week.

Users vs. Non-Users

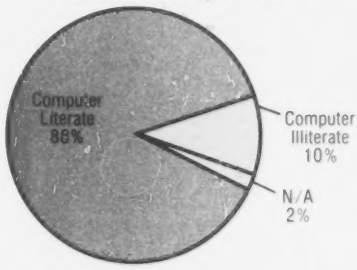


Source: Exxon Office Systems

Of the environments studied, computers are used heaviest in traditional data processing tasks such as inventory control. They are also being put to work in office automation tasks such as word processing and electronic mail.

While users and nonusers seem to have positive attitudes toward the computer, some negative attitudes are found more frequently among nonusers. For example, nonusers were twice as likely as users to say "computers terrify me," although the percentages in this group were very low (4 and 2 percent, respectively). More nonusers also agreed that "computers seem dehumanizing" (34 versus 24 percent). Three times as many nonusers expressed "computers are not for me" or "not for senior executives."

Profile of Respondents



Other negative attitudes are more likely to be held by users. Sixteen percent think "computers cause stress," while only 10 percent of nonusers hold this belief. More users found computers "difficult to adjust to, boring or distracting."

The most frequently cited sources for computer training are self-study through manuals (31 percent), training programs at work (28 percent), college (24 percent), the computer manufacturer (23 percent), coworkers (22 percent), the computer itself (12 percent) and a friend (5 percent). Sixty-four percent of nonusers who received computer training don't actually use a computer at work.

The study also found identical percentages of computer users in the 31 to 40 age group and the 41 to 50 age group (54 percent). There is also a similarity between the levels of computer use in companies with more than 500 employees (51 percent use) and companies with less than 500 employees (48 percent use).

"Older managers as well as younger managers are pursuing and using computer knowledge," the study concluded. "In short, the people factor is at work." WJC

Management

'If it doesn't work, try something else'

"Expert communicators are flexible, not rigid," says Houston-based psychotherapist Dr. John Bradshaw. "Remember, the part of the system which is most flexible will control the system. So if what you're doing doesn't work, try something else."

Bradshaw, who led two lively sessions on motivation and personal interaction at the recent Independent Computer Consultants Assn. meeting in Houston, had a warning for managers. "No matter what you intend, the meaning of your communication is reflected by the response you're getting," he says.

"To communicate well, you have to enter the other person's model of the world. But language often gets in the way of communicating because we mean different things by the same words," says Bradshaw.

"Eloquence is using power and not having other people know you're doing it. It's a sign of insecurity when someone has to keep saying, 'I'm the boss.' The greatest bosses know how to be eloquent," says Bradshaw. —CTT

Personnel biggest budget share, problem

Data processing (DP) budgets are on the rise in US corporations this year, according to a recent survey of Data Processing Management Assn. (DPMA) members.

A DPMA corporate newsletter, *COMP-U-FAX*, reports that 73.7 percent of those surveyed have higher budgets than they did last year. This is the first time such a survey has been conducted.

The average DP budget for 1984 was $1,638,582 or 2.46 percent of the total corporate budget. DPMA members believe this figure should be increased to 3 to 5 percent.

Personnel accounted for the largest share of the DP budget at 44 percent. Large systems represented 26 percent while micros accounted for only 6 percent. DP managers reported that software constituted 12 percent of their budget. The remainder consisted of maintenance and training at 9 percent and 3 percent, respectively.

DP professionals indicated that personnel is also their biggest budget problem. A majority of the respondents urged top management to provide incentives to boost morale. —WJC

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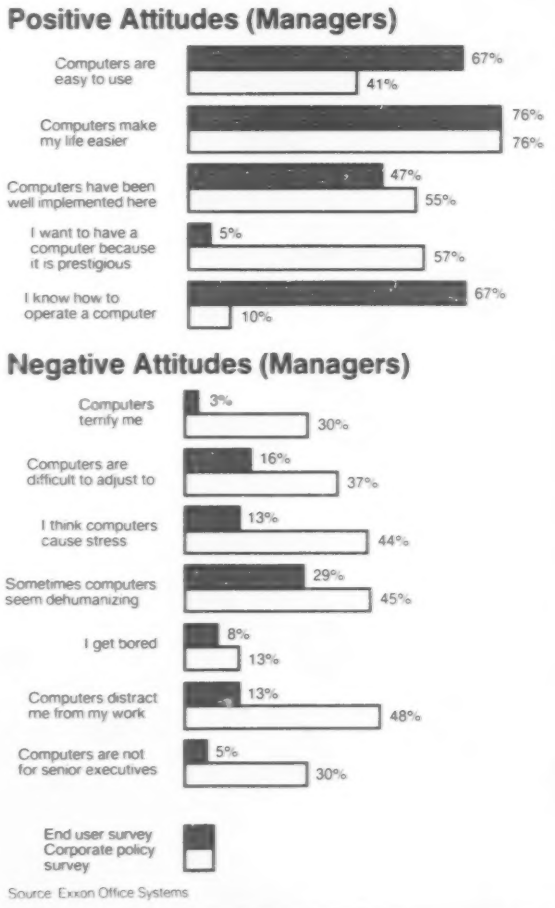
Computer Literacy

Information revolution moving too fast for companies to assess

The information revolution is progressing so rapidly that many offices have not had the chance to systematically assess their own automation processes. As a result, corporate training representatives underestimate the level of computer literacy among white-collar workers and overestimate the barriers preventing their personnel from learning.

These are some of the major conclusions of a corporate policy survey administered by phone to nearly 100 trainers at Fortune 500 service companies. In most cases, the contact person at the corporation was in the management information systems (MIS) area and was frequently involved in both hands-on and conceptual computer training.

End User versus Corporate Policy Profile



Source: Exxon Office Systems

This study and a concurrent poll drawn from a random sample of 5,000 middle managers were carried out by the Omni Group in conjunction with Exxon Office Systems, Stamford, CT. End users were asked for their perceptions on computer literacy. Interestingly, their responses conflicted with the corporate group's assessment in many cases.

Corporate trainers overall estimated that less than 10

percent of managers know how to use a computer when 67 percent say they have that skill. They also predicted that only 41 percent of managers would agree that computers are easy to use; 67 percent did.

Fifty-seven percent of managers would not want a computer "because it's prestigious," as the corporate group guessed. Only five percent complied with that theory.

Concerning negative attitudes, corporate representatives predicted 30 percent of managers would agree with the statement "computers terrify me;" only three percent did. Similarly, they said 37 percent would say computers are difficult to adjust to. Sixteen percent voiced this concern.

"Once people learn how to use computers, they tend to make good use of them to enhance productivity," the study notes. "And the more often these people use computers, the faster the barriers and negative attitudes fade away." —WJC

Microcomputers

Rehfeld of Toshiba says Japan not likely to take over market

In the microcomputer shakeout war—which some say has begun—a few Japanese companies like Toshiba, NEC and Fujitsu will secure market niches without capturing a dominant market share. This was the message that Vice President & General Manager John Rehfeld of Toshiba America Inc., Tustin, CA, gave attendees at a recent International Data Corp. conference in San Francisco.

"America may no longer own the computer business, but neither is it in danger of losing its technological domination to Japan," said Rehfeld. He illustrated his point by tracing the history of Japanese success in several key areas, including the 8-bit CP/M microcomputer market.

"The Japanese failed miserably in the minicomputer market in the '70s and also performed poorly in the 8-bit CP/M microcomputer market," Rehfeld said. "In the IBM-compatible 16-bit MS-DOS market, the jury is still out."

Meanwhile, there have also been some notable successes, particularly in the areas of aftermarket products such as printers and monitors and in the semiconductor sector. Rehfeld predicts that Japan will show strong technological leadership in the future not only in semiconductors, but in optical disks, communications equipment, miniaturization, voice recognition, laser technology, optical communication and applied controls and robotics.

Why have Japanese firms done poorly in their efforts to market computer systems under their own names in the US market? Rehfeld thinks it's largely because they are accustomed to manufacturing products with long life cycles, such as automobiles, cameras, consumer electronics and printers.

"The Japanese have been hard put to keep up with the high rate of technological innovation in the American computer market," said Rehfeld. "They're accustomed to having much more time to refine and evolve their products."

Rehfeld acknowledged that competition between the two countries is an "emotional subject," particularly for the semiconductor sector. But he maintained that it's good for the consumer to have worldwide competition.

The data processing world has already seen one example of how Japanese competition has helped it, noted Rehfeld. "The IBM-compatible products from Fujitsu and Hitachi have forced IBM to make many price/performance improvements during the last 10 years," he concluded. "And this trend will continue to grow in the years ahead." —WLM

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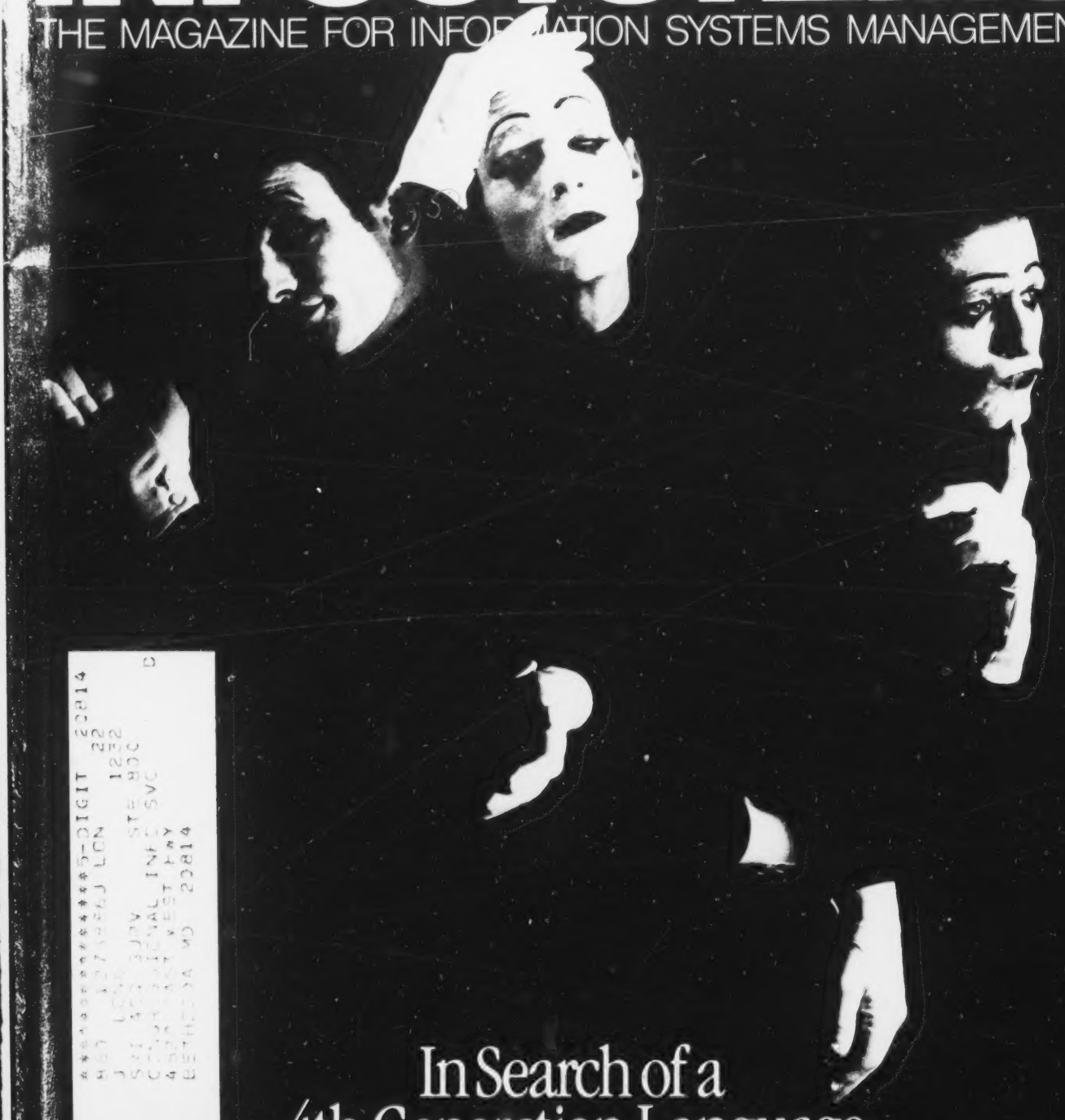

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Failure to provide proper work environment real source of ills

Management's failure to provide a proper working environment for its data entry staff is the real source of many health problems associated with the growing use of visual display terminals (VDTs). This is the finding of a survey conducted by the Data Entry Management Assn. (DEMA), which represents over 40,000 data entry managers, supervisors and operators.

Data entry operators, whose primary responsibility is keying information into a computer, probably spend more time in front of a computer terminal than any other segment of the work force. Clerical workers, who prepare, code and arrange documents for keying, were also polled to determine any differences between the symptoms described by computer operators and nonusers.

The survey asked the question, "Which of the following symptoms are you experiencing now?" DEMA polled 351 data entry operators and 140 clerical workers from 26 different data processing centers in the US and Canada. The centers represented both key-to-disk (73.1 percent) and on-line (26.9 percent) facilities.

Problems reported ranged from eyestrain and headaches to backaches and fatigue.

Complaints	Operator (%)
Eyestrain	68.7
Backpain	67
Fatigue	62.1
Neck/shoulder pain	61.8
Burning, irritated eyes	44.4
General irritability	39.9
Blurred vision	36.5
Arm/leg pain	35.3
Nervousness	27.6
Stomach pain	11.7
Swollen muscles/joints	11.4
Skin rash	6.8

Source: Data Entry Management Assn. (DEMA)

Norman Bodek, president of DEMA, pointed out that it is not the machines themselves that cause discomfort. The similarity in symptoms between operators and clerks seems to indicate that it is the nature of the work and the environment that causes discomfort, not high technology.

"We haven't looked at the problem deeply enough. What's the root cause of these problems? I think it's management's attitude that is the source of these types of problems," Bodek stated. "I believe we've lost sight of our duties as managers. Our job is to make sure our people are getting all the support they need to get the job done." —KGB

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